THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. Nº 231—13th YEAR.] LONDON, AUGUST 27, 1861. [Subscription { 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL has become the principal Cannel Coal used in the Metropolis. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. The Crystal Palace was lighted from it in 1851, and the Post-office, and *Times* Office, are at present.

FIRE-CLAY RETORTS and PIPES.

FIRE-BRICKS (marked "RAMSAY") OF ALL DESCRIPTIONS.

G. H. RAMSAY, Broad-chare, New-castle-on-Tyne. Manufactory established in 1804.

WANTED, a First-Class Mechanical Man as FOREMAN over a Gas-Meter Manufactory. He must be practically acquainted with the Making, Altering, and Repairing of Meters, and well up in all branches of the business. The person appointed will have to overlook a large body of men, so that great firmness, coupled with energy and tact, will be indispensable. Age not to exceed 40 years. Salary to commence at £130 per annum.

Applications for the appointment, accompanied by *copies* of testimonials of character and ability, to be sent to A. B. C., 136, Fountain Place, Bury New Road, MANCHESTER.

WANTED, immediately, a Practical MANAGER for the Corporation Gas-Works, Stockton-on-Tees. None need apply who cannot produce first-class testimonials of competency.

Address, with testimonials and statement of experience, and salary required, on or before the 4th of September next, to T. W. HORNSBY, Secretary to the Stockton Corporation Gas-Works, STOCKTON-ON-TEES.

Stockton-on-Tees, Augtst 20, 1861.

TO GAS-WORKS.

WANTED, a Steady Man, as Sole MANAGER and MANUFACTURER of the Gas-Works in this town, where the annual make is about 500,000 cubic feet. He will be required to fix, repair, and maintain meters, lay mains and services, attend to the public lights, keep and collect accounts. None but a man with unexceptionable references need apply. Salary, 20s. per week, with good house; also, water, coals, and light. All internal fittings the Manager may execute for consumers will be his own gain.

Apply by letter (in candidate's own handwriting), with testimonials, to S. HARLEY KOUGH, Solicitor, CHURCH STRETTON.

August 22, 1861.

TO GAS ENGINEERS.

WANTED, immediately, a Sub- MANAGER for a Gas-Work out of England, with prospect of preferment. Age not to exceed 35 years.

Applications by letter, stating salary required, eligibility, service, &c., and whether married or single, to be addressed, in the first instance, to A. B. C., care of Messrs. HARRISON and SONS, 82, CORNHILL, E.C.

WANTED, a good Stoker for a small Gas-Work.

Application to be made to Mr. JOHN RUSSELL, York Villa, Waterloo Road, UXBRIDGE.

WANTED, for the Morley Gas- WORKS, near Leeds, a competent WORKING MANAGER, who will be required to devote the whole of his time to the service of the said company. House, coals, and gas free. Further particulars may be known on application to the Secretary.

Applications, stating salary required, together with testimonials as to character and ability, to be addressed to the SECRETARY, not later than the 10th day of September next.

By Order of the Directors,
WILLIAM SMITH, jun., Secretary.

Morley, near Leeds, Aug. 23, 1861.

TO MANUFACTURING CHEMISTS.

THE Directors of the Huddersfield GAS COMPANY are prepared to receive Tenders for the COAL-TAR made at their works. The contract to be for three years, or for such other term as may be agreed upon at the time of making the contract. Any information required may be had on application at the Gas-Works.

Sealed Tenders to be sent to me not later than the 18th day of September next, endorsed "Tenders for Coal-Tar."

By Order of the Board, JOHN BURGESS,
Secretary and Manager.

Gas-Works, Leeds Road, Huddersfield,
August 24th, 1861.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE,
and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

Just published, price 2s. 6d.,

Addressed to Gas Consumers, Shareholders in Gas Companies, and Local Authorities, throughout the Kingdom,

GAS LEGISLATION, with a Copious Index, and Commentary on the Metropolis Gas Act, 1860.

By SAMUEL HUGHES, C.E., F.G.S.

London: WATERLOW and SONS, 49, PARLIAMENT STREET, and 66, LONDON WALL, E.C.

LAMP-POSTS suitable for entrances to Public Buildings, as well as ordinary street lighting, in upwards of 100 different patterns.

GLOBULAR LAMPS of superior manufacture, in Copper, Tin, Cast and Wrought Iron.

Please address in full, WILLIAM HOOD, 12, Upper Thames Street, LONDON.

TO GAS COMPANIES.

THE Advertiser, who is now the Manager of a country Gas-Work, is desirous of obtaining a situation in a larger establishment. He has had great experience in every branch of the gas business, and for upwards of six years held an important appointment in a large metropolitan work. The best references as to ability and character.

Address, R, M., No. 10, Park Terrace, Canal Road, STEPNEY, E.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N.,
LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

ADDISON POTTER
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

COUNTY and General Gas-Consumers COMPANY (LIMITED).—Works at Chertsey, Lea Bridge, Northfleet, Pembroke, Pembroke Dock, Ware, and Walton-on-Thames, producing a gas rental of about £6500 per annum.

Established for the erection of gas-works in provincial towns, or the purchase or leasing of existing works on equitable terms. Application to be made to the Engineer to the Company, Mr. H. P. STEPHENSON, 58, PALL MALL.

TO Practical Gas-Fitters, having command of a capital of £400 to £500, there is an eligible opening for a young man of energy to take an established and lucrative business in one of the British Colonies.

Applicants to state the amount of capital they can command, with full particulars and references, to X., care of Mr. W. B. KING, 11, Bolt Court, Fleet Street, LONDON.

TO GAS COMPANIES, CHEMICAL MANUFACTURERS, &c.

TO be disposed of, the Entire Plant for manufacturing Sulphate of Ammonia, consisting of Still, Condenser, and Cooler, capable of holding 1200 gallons of liquor; only recently erected. The whole will be sold on reasonable terms, as the ground is required for other purposes.

Application to be made, by letter in the first instance, to Mr. W. J. HOLLANDS, iron merchant, &c., 12, Bankside, SOUTHWARK, C.E.

FOR Sale, at the Oxford Gas-Station, A Condenser, composed of 24 7-inch Flanch-Pipes, 9 ft. long, connected at top by Flanch-Bends, all standing on a cistern divided into 12 compartments.

11 7-inch Slide-Valves.
10 6-inch do. do.

A Centre-Valve for 4 Purifiers, with 10-inch Connexions.

A variety of Bends, Branches, and T-pieces, all in good condition, and only removed to make room for extension of works.

Application to be made to Mr. HENWAND, Gas-Works, OXFORD.

TO GAS COMPANIES.

TO be sold, 3 Purifiers, 9 ft. by 4 ft. 6 in., and 3 ft. 6 in. deep, with partition in the middle. Also, One 6 ft. 6 in. by 2 ft. 8 in., and 4 ft. 6 in. deep.

Also, Four 10-inch 4-way DIAPHRAGM VALVES, with Connexions. All in good order.

May be seen, and further particulars obtained, on application at the Croydon Gas-Works.

CHARLES FARRAN, Manager.

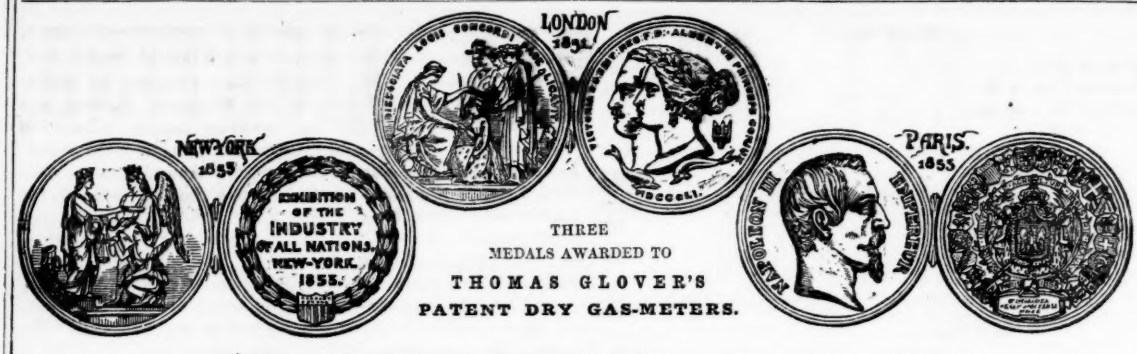
TO COAL MERCHANTS.

THE Croydon Commercial Gas and COKE COMPANY are desirous of receiving Tenders for the Supply of 2000 TONS of RAVENSWORTH PELAW COALS, to be delivered at Deadman's Dock as follows:—500 tons in September, 1000 tons in October, 500 tons in November, 250 tons in March, and the remainder in April next. The Tenders to state the price for cash on delivery, and the price for payment by the Company's bill at four months from each delivery.

Tenders to be sent to the undersigned on or before the 3rd of September next, but the Directors do not bind themselves to accept the lowest or any Tender.

JOHN and WM. DRUMMOND, } Joint
HY. RICHARDS. } Secs.

Croydon, August 19, 1861.



THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to leave the Meters all in perfect working order.

N. B.—Agents in several parts of England are wanted. Apply by letter, or personally.

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

PATENT IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS,

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

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All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 27, 1861.

NOTES UPON PASSING EVENTS.

THE evidence given before the Thames embankment commissioners affords more than one curious instance of hobby-riders: men, without the slightest experience or even theoretical knowledge of the work required, came forward to present their crude ideas with perfect self-complacency; others, who had a title to be considered engineers, seemed never tired of hearing themselves talk. The patience of the commissioners seems to have been wonderful; we cannot say that it was beyond all praise, because it really would have been quite as well if a check had been given to several of the chatterers. Docks and railways were the leading features of the plans of the most eminent engineers. The docks above Temple Bar were wisely dismissed by the commissioners. Full of Thames mud and water, they would be a nuisance maintained at great cost, and they will be wisely replaced by a solid embankment in a situation where land will be worth more than water. There are many sound arguments in favour of a railway to complete the circle of metropolitan lines; but, if the branch in course of execution from Hungerford to Cannon Street were connected with a railway on an embankment from Vauxhall Bridge to the proposed Cannon Street Bridge, there would be no need of a railway-link on the northern embankment. It is commonly understood that the South Western Railway Company, who have power to use the Hungerford Bridge, have neglected to secure land for a station. If that be so, our suggestion that they should use the Thames embankment to obtain access to frontage in Charing Cross, is likely to be realized.

The following are a few specimens of the curiosities of the evidence inflicted on the commissioners. Captain Spencer Perceval Plumer says that he is "not a professional man, or an engineer, or a man of science;" that he is "totally unacquainted with engineering," and "afraid that I shall throw so little light upon the subject that I shall not set the Thames on fire with my scheme." He was perfectly right: anything more absurd, or more likely to be a nuisance than Captain Plumer's "idea," it would be difficult to conceive—a sloping, barge bed as an embankment, over which the tide would flow, carrying a viaduct. Mr. Benjamin Bush proposes an underground railway from Pimlico to the Blackwall Railway, and "a system of passing all the sewerage matter collected in the low-level sewerage plan through a process of precipitation and filtration," and claims the important advantages of—"First, the collection of a most valuable manure; second, the transferring to the Thames, pure water; third, saving the cost of all pumping-stations but one, as the filtered water could be immediately pumped into the river." Unfortunately for Mr. Bush, the foundation of his plan fails—the stuff he could collect from the sewers would not be worth the cost of carriage as manure, and thus all his savings and profits disappear. Mr. Ernst Gôhns, a German we presume, supported the mystical character of his nation with the following description of a scheme which has the merit of being brief, although unintelligible: there were other papers equally unintelligible, and very long. "First," says Mr. Gôhns, "this plan is to effect the simple and perfect riddance of the flowing of the sewerage of the Thames and the metropolis to any given point, say 5, 10, 20, or 50 miles, or to any distance or direction, where it may be deodorized and sent, *not* into the sea, which *spurns* it, but into the land, which *yearns* for it; second, to obviate all necessity whatever for extracting even the smallest quantity of the water of the Thames, which, at the same time, it perfectly purifies; third, the simple and perfect prevention of any smell arising from the drainage; fourth, any overflow arising from the highest tides is rendered impossible; fifth, this plan does not interfere with any present or contemplated mode of drainage, except to render the latter nugatory; sixth, this plan has no resort to pumping." Mr. Gôhns showed a model—with "store rooms over the sewer—to contain soldiers, in case fortifications were required!" and promised docks and esplanades. Being asked by Captain Galton, "How do you avoid any pumping of sewerage?" he replied, "There would be no pumping at all; I cannot state in what way; it is, at this moment, my secret!" Mr. Christopher Bagot Lane, who has no model or drawings, is almost equally amusing. He came forward to lay down "the general principle" that no embankment scheme would be satisfactory that did not include a high-level railway, connecting all the London stations. He "had nothing to suggest" as to the execution of the embankment or the roadway, except "that a branch could be carried from the end of Victoria Street, *so that her Majesty could have a private means of passing from her palace to any railway in England.*" He is also anxious that gentlemen of the House of Commons should not be "under the necessity of passing on foot, in the dark, through a wet and dirty street going to a division," instead of being carried over from Westminster station by the Bagot Lane High-Level Railway into the "House, without going into the open air." Even the merchants are not forgotten; they are to have high-level railways "to the Bank and the Royal Exchange." Since Dean Swift's Laputan machine, worked by two horses, for cutting cucumbers, we have read nothing so clever as this. It seems Mr. Lane has published a pamphlet. Why does he not send us a copy? Mr. David Thornbury, who has been engaged for forty years in carrying out works of drainage, proposes an embankment, sixty feet wide, from Vauxhall to the Tower, to contain the sewer, and to continue the sewer to Barking on the Thames, at a cost of £850,000—a road for heavy traffic on the embankment, and another road, supported on pillars, at a high level, for light carriages. This pillar idea is reproduced by several witnesses. Sir William Wolsey talked—we cannot say explained—at great length on the "*hydrodynamic*" action of the river, whatever that may be—mentioned all his pamphlets and his correspondence with divers newspapers; but, although he talked four columns of print, the commissioners wisely asked him no questions. He seems to wish to reduce the Thames to a uniform width of 200 yards, and so gain land, which he values at "seven or eight millions;" to set up tidal-gates at London Bridge, and drag all the boats through by steam that now float up with the tide: twice over he speaks of "embankment-quays, flights of steps, piers, and lights, and so on." In like manner, Mr. F. Cayley Worsley proposes to give up the invaluable water-power of the tide and flow of the Thames, and make a lake to Richmond, "skirted by architectural buildings, luxuriant trees, public *boulevards*, together with the luxury of bathing, boating, and skating." Mr. J. Edmeston proposes a railway, 12 feet below the existing floors of

warehouses on the river, and does not shrink from underpinning the lofty buildings, now standing on a treacherous soil on the banks of the river. Mr. William Austin has a plan for a roadway, 30 feet wide, with a narrow canal between his embankment and the present shores of the Thames, to begin at Fulham and be carried out to the Nore! A model of this scheme has, the author stated, been executed at a cost of two thousand—probably a misprint for two hundred guineas—and presented by Mr. Roupell, M.P. to the South Kensington Museum. Major Wieland revels in the notion of an esplanade, 40 feet high, "which would appear from the Temple Gardens like the side of a cathedral; or, if they chose, they "might have open arches, or fill it with glass, and make a winter garden, 33 feet long, and 80 feet broad." Mr. William Paice "is not an engineer;" he "knows nothing about the condition of the ground," "or the quality of the soil," "or the difficulties of making a sewer along the Thames bank;" but he presents a plan concocted by himself, "and another party—a civil engineer." Mr. Paice had the merit of brevity. We cannot say the same for Mr. Bird, who fills up twelve columns of print almost without a break, to explain what might have been contained in one. His plan included a railway, docks, a private company, and, in fact, everything that the commissioners rejected, although nearly eighteen columns are filled with his oration and explanation. The more closely the evidence is examined, the more reason there is to approve of the engineering conclusions of the commission, as to the execution of the work, it obviously falls within the province of the Metropolitan Board of Works. Parliament must not act like those parents who, without giving their sons anything to do, declare that they are fit for nothing. It is worthy of note, and not very creditable, that the representatives of the Crown properly threw every impediment in the way of a complete embankment scheme. Mr. Pennethorne was all anxiety for the privacy of the Duke of Buccleugh, and actually argued that a fine garden added to Montague House, in lieu of mud banks, was no compensation for a road which would pass at 260 feet, at least, from the house.

The *Times*, moved to indignation by the opening of the Boulevard Malesherbes, and a consequent comparison between the state of London and Paris, calls for a commission on metropolitan improvements. For what pray? To report, or to execute? The wants of London have been reported on more than once—humble plans have been suggested by the Metropolitan Board, magnificent ones by Sir Joseph Paxton, and the competitors for the public offices. There is no difficulty in finding schemes and schemers. The volume of evidence from which we have just been extracting, proves that the two things wanting are power and money, especially the latter. Are the inhabitants of London prepared to submit to the taxation of Paris, to levy a duty on every carrot and cabbage, every pig, every sheep, every ox, on every beast in fact, or thing eaten or drunken within the metropolis, and place the produce in the hands of an irresponsible commissioner or board, with power to pull down, build up, level hills, raise streets, make bargains with building companies, and set parishes and private proprietors at defiance? If they are, Mr. J. Scott, Sir Joseph Paxton, Mr. Tite, Mr. Bidder, Lord Mayor Cubitt, Mr. Pennethorne, and others without number, known and unknown to fame, will very soon prepare designs involving a metropolitan debt of a few millions, and securing improvements. But, as it is well known that London is not at present prepared to pay any more local taxes—as the coal duties were not renewed without a strong protest from the manufacturers and suburban residents, as the Chancellor of the Exchequer is not likely to relinquish the revenue he derives, most unfairly as compared with the rest of England, from the hackney-carriage duties—there is only one resource, and that is, to develop private enterprise, by bestowing by one general Act the same powers on building companies or contractors that railway companies enjoy under special Acts. Capital accumulates very rapidly in England, so rapidly that it has often flowed away to waste in American railways, bonds, mines, and other foreign swindles. We have great contractors ready and anxious to employ plant and men placed at their disposal by the completion of the British railway net. We have a specimen of what might be done in the bold speculation of Messrs. Kelk and Lucas Brothers in the Great Exhibition building. The same contractors, or at any rate the same class of contractors, would, if fairly supported by rational compulsory powers for purchasing property, finish Victoria Street, Westminster, rebuild Trafalgar Place and the Strand, and open up more than one needful thoroughfare. But such people will not burn the candle at both ends—sink a large sum in a speculation which it will take years to wind up, and be subject to the extortions of every owner of a decayed house, or a collection of hovels.

Sir William Armstrong, much troubled by the many dormant patents unused, and not likely to be used, which impede his progress in artillery reform, has been giving the weight of his authority to the select few who are altogether opposed to granting the limited monopoly conferred by patents of inventions. There is no doubt that patent rights are frequently injurious to public interests—but so are all rights of property. A landowner who obstinately refuses to drain his land, who discountenances all agricultural progress, who will not permit a labourer's cottage on his estate, also commits sins against the welfare of the State. When the Corn-Law Repeal Act passed, a great landowner pulled down every cottage on his estate; and a late well-known M.P. and colonel would not allow his farmers to use a steam-engine. Landlords, not far from London, have forbidden their tenants to trim their hedges, or use a reaping-machine, because both processes destroyed the shelter of game. But no one in this country, in consequence of such exceptional instances of folly, would propose to break through the rights of property, and make a law for regulating landlords duties. We trust to time, and the effects of a healthy public opinion. Sir William Armstrong looks at the subject of patent laws too exclusively from his own point of view. He does not want to make money by his inventions, but fame. He is a patriot, and has other sources of sufficient income. But all men are not so fortunate. Patents of invention, we may venture to repeat, are a contrivance for inducing inventors to accept the profits of a limited monopoly, instead of the possible profits of secrecy. Before patents were granted, ingenious men devoted their energies to such inventions as could be kept secret. The men most capable of selling, of carrying on a great manufacture and trade, are seldom those most able to invent. A wise patent law enables the inventor to deal, on something like even terms, with the capitalist, manufacturer, and tradesman. He can work out his invention through toil and privation, certain, if it be really good, of a reward. There is a very recent instance of a manufacturing improvement of the greatest commercial importance which reduced the inventor to absolute poverty—to an attic, and weekly wages—while he was completing it, and, when completed, raised him to affluence and a seat in Parliament. Is mere money to have the command of the brains as well as the hands of the unmoneyed public? That is a fair question. Free trade in inventions is a new reading of "property is robbery." Why not in copyrights, too? The case of Crompton, and other early workers at cotton-spinning machinery, should teach us better. At the same time, it is a serious public evil that there should be inventors, like dogs in the manger, overlying an unused principle or machine. We are glad to see that a committee of the Social Science Association have adopted a recommendation we have more than once made, that the right to use any pretended invention, or part of an invention, should be the subject of compulsory arbitration. Competent tribunals, either as juries or as assessors, are much needed for the decision of patent cases. Some one should be on the bench capable of checking, we will not say the hard swearing, but the hair-splitting, of scientific witnesses.

A very awkward attempt at collecting agricultural statistics has just been made by Sir George Lewis, as Home Secretary. He has sent a circular to magistrates in quarter sessions, asking if they could employ the country police to collect answers to a set of questions which only include the number of acres devoted to each description of crop. Farmers have a prejudice—it may be an ignorant prejudice—against agricultural statistics. This prejudice dates from the days of tithes in kind, and the taxing experiments of Pitt; and, until their prejudices are removed by open discussion, no plan of collecting statistics is likely to succeed. Those who have paid the most attention to the subject, are convinced that no benefit would be derived from returns made out before the harvest, with the view of estimating the yield on official authority. On the contrary, if the Government officers made mistakes—and they would occasionally and inevitably make very serious mistakes as to the yield after threshing—the Government would be loaded with an amount of responsibility and consequent odium, which it has always been considered, by our constitutional and not

paternal Government, wise to avoid. Agricultural statistics will tell nothing useful about the yield of a harvest until it is too late to guide importations; but they have another value, of scarcely less importance—they register the progress of agriculture. If we know from year to year what number of acres are in wheat, barley, oats, artificial grasses, and natural pasture in each district, and can note the comparative increase and decrease, we can search out the reason why such statistics would be the foundation of a useful history of agriculture. In Ireland, where the agricultural statistics are collected in a rough way by the police, they have been the death of volumes of wild declamation. Again, although an enumeration of live stock does not, without notes, give a distinct idea of the probable supply of meat, because one breed weighs twice as much as another, it becomes valuable when compared with importations and losses by disease. We hear vaguely of great losses in horned stock and sheep; we hear great cattle salesmen gravely proposing to forbid the killing of calves; and we do not know, within a million, how many cattle or sheep we have. A plan of agricultural statistics might be devised, which, without impertinently prying into the affairs of any individual farmer, would supply information of great national use. But it can only be carried out by the co-operation of the farmers; they must first be conciliated.

A prize of 500 francs was offered in 1860, by Baron de Damas, for the best essay or report (*étude*) "*Sur l'Etat actuel de la Famille en France*"—we give the original words, because *famille* is not translatable. Fourteen essays were sent in; but the French Society of Social Economy, to whom the decision was intrusted, did not consider that any of them fulfilled the conditions of the programme. The subject has, therefore, been again proposed by Baron de Damas, who has doubled his prize; the Society of Social Economy have added 500 francs, and thus raised the total value to 1500 francs. The inquiry is to be limited to small proprietors of the peasant class, working entirely on their own property, and not for wages elsewhere. "This class," says the *Revue Scientifique*, "which, under *l'ancien régime*, formed almost the foundation of the French nation, is still one of its most essential elements. The existence of the peasantry is intimately allied with the quality of the soil and the water, with the climate, with spontaneous productions, and, generally, with the primordial conditions of material life." "Strongly impregnated with the true instincts of their race, little affected by the false ideas and corrupt morals which, at certain periods, pervert the men of leisure in refined society, they preserve national traditions more completely than other classes." "Therefore, amongst them, at epochs of moral deterioration, civil dissension, the basis of reform, must be sought." "In this point of view, a study of these peasant classes is likely to be more useful than that of the rich or of urban populations, whose artificial and unstable mode of life is less characteristically national." The attention of competitors for the prize is especially called to the effect of the laws of succession. They are called on "to supply *facts*, showing whether the social and moral condition of the peasant is best promoted by the forced division enacted by the law of the 7th of March, 1793, and the civil code, or by the custom of unbroken transmission, which is still preserved, with other ancient customs, in several rural districts in the middle of France." The subject of this prize is so interesting, so large and important, that we hope it may be taken up by one of those admirable writers, Lavergne Barral and Michel Chevalier, who so well support the character of French periodical literature—essays at once practical and philosophical, in the *Revue des Deux Mondes* and *Revue Contemporaine*. To us who fancy that we see the character of our nation most favourably developed in our skilled mechanics and our vigorous higher middle classes, it sounds curious that unlettered peasants should be taken as the best specimens of intellectual France. French peasants make famous soldiers, so do Irish; both are brave, both are superstitious, both cling to the soil, and both are very much improved by being transplanted far from old associations.

We note that at one of the meetings of the *Cercle de la Presse Scientifique* the subject of railway accidents came under discussion; and it was there stated that the English statistics of railway accidents are much more complete than those published by the French Minister of Commerce; and that a comparison of the number of accidents on railways in the two countries shows that they are less frequent in England than in France, although the pace of trains is much greater in England. We were not prepared to hear this, because not only is railway speed much higher in this country, but the trains are more frequent, and the net-work is much more complicated. There is always a certain degree of danger wherever a rail is divided, and, therefore, the more frequently a rail is crossed by another line, the more likely is it that accidents will occur, not only from collisions, but from trains at high speeds leaving the rails at crossings. Mr. Chadwick has repeatedly read statistical papers, showing that accidents were less frequent in France than in England, in consequence of the admirable regulations of the Government. But it it is an old and true joke that nothing is so little to be depended on as Mr. Chadwick's facts, except his figures. M. de Fouvielle who read the paper, suggested that the French railway companies should be compelled to publish an account of every accident in the local newspapers, and in the *Moniteur*. In England, our coroner's inquests and active newspaper reporters save us the necessity of any such law. M. Barthe suggested that many of the English accidents arose from the recent use of an inferior quality of iron rails. It is probable that the charcoal-made rails of France are tougher than the cheaper description of English rails, supplied in competition, and chosen by directors fond of the cheapness at any cost. The chairman of the committee, M. Barral, asked whether "the more prudent character of the English people did partly explain the difference in the number of accidents? The English police regulations are less strict, but then the travellers take more care of themselves." This is partly true; people are like dogs—the more care you take of them, the less care they take of themselves. If you are always looking after a dog, he will not take the trouble to keep you in sight. "M. Sainte-Preuve thought that the English railway police had been improved," but he is quite mistaken. The whole tendency of our railway companies has been for some years past to diminish the number of their platform servants. We hope this discussion of the *Cercle Scientifique* may lead to some relaxation of vexatious restrictions and regulations of French railways. In the life of Ary Scheffer, by Mrs. Grote, we read a melancholy instance of the pain inflicted on that distinguished artist by an imprisonment at the railway-station at Calais, at a time when he was slowly dying.

Advices from New South Wales inform us that the differences between the Government engineers and Sir Morton Peto and Co., which long retarded the railway works there, have been at length amicably settled by concessions on the part of the Government, and it has been agreed that the works in hand shall be completed at various dates between May, 1862, and January, 1863. The scheme for horse railways, brought forward by Sir William Denison just before his departure for Madras, has been given up, and it is now proposed to extend the lines made by Messrs. Peto, which are on the English model, and calculated for high speeds, by other lines with gradients and curves, which will not allow a speed of more than fifteen miles an hour, at a proportionate reduction of first cost. This sounds rational. High speeds in such a colony are absurd. The new colony of Queenland has already founded a company for introducing steam navigation on its many rivers. In Sydney, the Assembly has voted £10,000 for a museum; the design is Grecian, disfigured by side windows, "as in that climate it is impossible to make a water-tight skylight." This fortunate colony, in spite of commercial depression, carries over a balance of more than £600,000 from the revenue of 1860. Nevertheless, the public debt for railways, water, sewerage, and other public works amounts to nearly four millions. In the colony of Victoria, vineyards continue to increase, and it is proposed to form joint-stock companies, to purchase grapes and manufacture wine. Explorations are being carried out on the Snowy river, with the view of propagating salmon, to be imported from England. The probabilities of success in such a warm climate are not encouraging; the sea will be found too warm if the rivers are cold enough; but it is impossible not to admire the intellectual activity of our Australian cousins; they have even made cricket an institution, and have arranged the expenses of an All England Eleven to Victoria and back again. It is not often that we can agree with Mr. Chadwick, but his suggestion of three hours schooling and three hours drill in gymnastics, in rural schools, is essentially sound. The Australians seem determined not to fall into the "all-work-no-play" mistake of the Yankees.

Circular to Gas Companies.

A SMALL book, with the imposing title "Gas Legislation," though relating almost exclusively to the Metropolis Gas Act, has just appeared from the pen of Mr. Hughes. It commences with the Parliamentary history of the Act, and of the proceedings during the four sessions of Parliament, before it was passed; and, after giving a classified summary, and a copious index, the writer proceeds to comment on the clauses of the Act *seriatim*, from first to last. A faithful summary of the history of the Metropolis Gas Regulation Act, and of the proceedings preparatory to the passing of that important measure, with an impartial commentary on the several clauses, would be a valuable addition to the knowledge of gas legislation, but it is not from so violent a partisan as Mr. Hughes that such a work can be expected. The feelings that seem to have actuated him in the production of this book, have been apparently various and sometimes conflicting. Great indignation is expressed at the present lethargy of the local authorities, who were in times past so energetic regarding the interests of the consumers of gas; and, while the Act is in one page condemned as unsatisfactory, it is represented in another as highly valuable. Though Mr. Hughes is inconsistent in this respect, he is steadfast in the laudation of himself and Mr. Beal, and in his inveterate hostility to the gas companies. In the history of the Metropolis Gas Act, his main object is to prove that the companies, having rejected the proposal of Sir William Congreve in 1823 to grant them a regulated monopoly, "Parliament has ever since seen the necessity and recognized the principle of protecting the public by means of competition." This is a fallacy which we have again and again refuted. With one or two exceptions, previous to the passing of the Gas-Works Clauses Act, 1847, Parliament has not encouraged the establishment of new companies to supply districts with gas which were already occupied by the mains of other companies. In various parts of the metropolis, the *local authorities* have encouraged the formation of new companies, being induced to do so by the offer to supply gas to the public lamps at unremunerative prices, and, *after such companies have become established*, Parliament has not refused to sanction their continuance. It is not true, therefore, to state, as Mr. Hughes does in another page, that the principle of competition has been "actively encouraged" by Parliament. The history of the proceedings during the three years preceding the passing of the Act is still more open to the charge of misrepresentation, by the omission of facts which formed principal features in the agitation for cheap gas. Mr. Hughes carefully conceals that the efforts of the agitators were, in the first instance, principally directed against the districting, and the monopoly it created; and that it was attempted to defeat that arrangement by the formation of new gas companies. It was not until after the first parliamentary inquiry, when the witnesses, brought forward by the delegates themselves, proved the districting to be beneficial to the public as well as to the gas companies, that they would consent to the monopoly, however regulated. In describing the progress of the bill through Parliament, Mr. Hughes also makes omissions which are calculated to produce erroneous impressions. He omits to mention that, after ten days examination of the witnesses called to establish the charges of exaction, fraud, and tyrannical abuse of power that had been heaped on the metropolitan gas companies, the chairman of the committee expressed the opinion that nothing had been laid before them which affected the character of those companies. Mr. Hughes omits to notice that the amendments proposed to be introduced by the committee into the original bill, in order to protect the interests of the gas companies, were of such a character that the promoters threatened to withdraw it; and, without alluding to the subsequent vacillating conduct of the committee, or to the influences which produced it, he wishes to make it appear that the bill, as first reported to the House, and which was "perfectly satisfactory to the promoters," represented the unbiassed sentiments of the committee, and that they afterwards altered it against their will, and only in consequence of the pressure brought to bear on the House of Commons by the joint-stock interest. When the bill was recommitted, we are told by Mr. Hughes, that "it was only by great exertions that the promoters were able to save anything out of the wreck of a measure thus dealt with; and so the bill proceeded, amid threats of withdrawal, until it finally assumed its present shape;" and, he adds, "notwithstanding all the phases through which the bill has passed, and the rocks and shoals on which it so narrowly escaped shipwreck, the Act is still a valuable one, and, if not perfect, contains, at all events, the germ of better, and more successful, legislation." The advantages obtained by the Act are then set forth, for the purpose of showing that the "Herculean and incessant assiduity" of Mr. Hughes and Mr. Beal has had the effect of producing great public benefits, and ought to be adequately acknowledged. The benefits they have conferred on the gas consumers of the metropolis are stated to be: An annual saving of £21,000, in the south metropolitan districts, by the reduction in the price of gas by two companies; the addition, throughout the metropolis, of two candles to the illuminating power of the gas, which is estimated to be worth £200,000 a year; and an important saving in public lighting, if the local authorities will avail themselves of the privilege of burning gas in the street-lamps by meter. In addition to these advantages, Mr. Hughes says he looks forward with confidence to a general reduction in the price of gas, from the operation of the dividend clauses, and from the facts that will be brought to light by the searching form of accounts devised by the Secretary of State. Having thus pointed out the benefits which the gas consumers of the metropolis have derived from his Herculean efforts, Mr. Hughes attempts still further to magnify his claims to public gratitude by picturing the deplorable state to which the gas consumers would have been reduced by the exactions of the companies, had the Act not passed; for, he says, the illuminating power of the gas would have been diminished, the price would have been increased, and the dividends would have been raised "to a perfectly fabulous sum." Mr. Hughes having thus, according to his own fabulous account, conferred such immense benefits on the London public, it is lamentable to observe the ingratitude of the local authorities, and of the gas consumers in general, to their benefactors. It may be that the advantages obtained are much less than the promised gains, and that it is now known they might have been attained by amicable arrangement with the gas companies, without his interference. It may be that the abandonment of the main object for which the agitation was commenced has caused disgust, and that the exposure in the parliamentary committees of the many fallacies by which the public were misled, has rendered them incredulous of present assertions. Whatever may be the cause of this want of appreciation of the services of Mr. Hughes and Mr. Beal, the fact is undeniable; and it is pitiably noticed in the preface by Mr. Hughes, who complains that the local boards and vestries are making no use of the Metropolis Gas Act to protect the interests of their ratepayers; and that, "owing to the prevalence of many petty, miserable, but conflicting interests, the sublime policy of inaction seems to be at present triumphant."

We reserve for another occasion a more particular notice of Mr. Hughes's commentary on the several clauses of the Act, and shall now only allude to one or two points relating to the testing clauses. He very fairly describes the mode prescribed for testing the purity of the gas as unjust to the gas companies, for he observes there is scarcely any gas manufactured in London that would bear a test so severe as exposure to turmeric paper without discolouration. As the Act authorizes the local authorities and the gas companies to agree to a different test, Mr. Hughes suggests that they should enter into an amicable compromise, the local authorities giving up their right of testing for ammonia with turmeric paper, if the companies will consent to have their gas tested for purity wherever it is supplied; the limitation of 1000 yards from the works being, as he asserts, a blunder made by the committee, from not understanding Dr. Letheby's evidence. Mr. Hughes, however, should not be so ready to accuse the committee of blundering, for he himself commits a greater blunder in his interpretation of the testing clauses. The 19th clause requires, in the first place, the local authorities to provide "all proper and sufficient apparatus and instruments for testing the illuminating power and purity of the gas," and to appoint a competent testing officer. By the second section of the clause, the gas companies are required, within six months after the passing of the Act to erect, as near as may be 1000 yards from the works, an experimental meter, furnished with a suitable burner, with other apparatus, for testing the illuminating power of the gas. It is evident from this clause, taken in conjunction with succeeding ones, that it is intended that all the testing opera-

tions shall be conducted where the experimental meter is placed; but, according to Mr. Hughes's interpretation of the Act, preliminary testings are to be made at places to be provided by the local authorities, and the results of those experiments are to be verified with the apparatus, and at the place provided by the gas companies. Such an interpretation is inconsistent with the tenor of the testing clauses; and, had Mr. Hughes carefully considered them, he would have seen that there is no absurdity or inconsistency in the requirements of the Act in that respect, and that it will not be necessary to have duplicate testing stations in the same district, and that the testing for purity, as well as for the illuminating power of the gas, must be made within 1000 yards of the works. Mr. Hughes's publication is addressed "to gas consumers, shareholders in gas companies, and local authorities, throughout the kingdom;" but, we apprehend, its chief value to shareholders is to put them on their guard against the attacks on their property advocated by the writer in his commentary on the Metropolis Gas Act, and which we intend to notice in our next number.

Most of the gas Acts passed during the last session have been printed; and, by comparing them with the bills as originally introduced, we are enabled to perceive the general principles which have guided the Legislature in dealing with gas interests in the session which has just closed. It is satisfactory to find that the committees have adhered to those principles which we have often advocated—viz., the adoption of a higher standard of illuminating power, combined with a remunerative price, and the discouragement of the supply of gas by local authorities with the appropriation of gas profits to other than gas purposes. It is also to be seen that the precedent of the Metropolis Gas Act has been followed in several points; as in requiring gas companies to lay down pipes to any premises, at given distances from their mains, on receiving guarantees of reasonable remuneration for the outlay, and in the provisions of the quality and purity clauses.

Proceeding in alphabetical order, the first Act is that for incorporating the Atherton Company, in Lancashire, for supplying that and the neighbouring towns with gas. The bill originally provided for the supply of water as well as of gas; but all the clauses relating to the water supply were struck out, and other clauses were added, limiting the price of gas to 5s. 6d. per 1000 feet, fixing the illuminating power at 12 sperm candles, and providing for testing it at the works of the company. The bill contained no clauses relating to price or illuminating power, nor does the Act make any provision for testing the purity of the gas.

The Bolton Corporation Bill was very severely handled in its progress, having been cut down to about one-third its original proportions. The Bolton corporation sought for power to purchase the works of the Bolton Gas Company, or, should they fail to make an agreement with the existing company, the corporation required Parliamentary authority to establish gas-works of their own. The committee in the Commons refused to grant any competing powers to the corporation, but permitted the purchase of the works, if the consent of the holders of three-fourths of the shares were obtained; that consent, however, being clogged with the condition that none of the profits from the sale of gas should be appropriated to the improvement of the town, or to other purposes than the supply of gas. This was a serious blow to the attempt to carry out the Manchester system in Bolton; and, when the bill got into the House of Lords, such attempt was still more effectually prevented by striking out all the clauses relating to the purchase and establishment of gas-works; and, as the Act stands, it only relates to the supply of water, and to the improvement of the town.

An opposition to the bill for incorporating the Clitheroe Gas Company was compromised, but the principal alteration made in it was a reduction of the maximum price of gas from 6s. to 5s. per 1000 feet.

The Dewsbury and Batley Gas Company sought to increase their capital from £35,000 to £100,000, with permission to attach preference dividends to the new shares, not exceeding 5 per cent. The bill was opposed, and in the Act, as passed, the dividends on the new shares are limited to 7½ per cent., without preference; and the quality clause is altered by raising the illuminating power from 11 to 12 sperm candles, and by the addition of 20-candle cannel gas; the price of the former being reduced from 5s. to 4s. per 1000 feet, and the maximum price of the latter is fixed at 7s. 6d.

The Elland Company, who supply an extensive district, sparsely populated, were subjected to a vexatious opposition, at the instigation of the town-clerk of Halifax, on application for statutory powers and an increase of capital. There was no opposition to the preamble in the committee of the Commons; but the town-clerk, who represented the petitioners, took part in the discussion of the clauses, and several important alterations were made at his suggestion. In the original bill, the standard of illuminating power of the gas was fixed as low as 8 sperm candles, but it was afterwards increased to 12, and then to 14 candles; and the maximum price was reduced from 5s. 6d. to 5s. The opposition was renewed with greater energy in the committee of the House of Lords, but their lordships refused to make further alterations, and the bill passed in the same state that it left the Commons.

The Haslingden Gas Company, and a newly-projected company, applied to Parliament to be incorporated in one company. The capital of the united company has been raised from £30,000, as first proposed in the bill, to £40,000; the illuminating power of the gas has been raised from the proposed 10 sperm candles to 12; while the maximum price has been reduced from 6s. to 5s. per 1000 feet. There is no clause for testing the purity of the gas.

We noticed the character of the opposition to the Huddersfield Gas Company's incorporation bill during its progress, and the defeat of the improvement commissioners in their attempts to force the company to sell their works to them at a lower price than had been previously agreed. For that purpose, witnesses were brought before the committee to depreciate the value of the works; but the company succeeded in establishing the value of their share capital at the estimated sum of £60,000, and the Commons committee struck out all the clauses empowering the commissioners to purchase the works. The same attempt was repeated in the committee of the House of Lords, but with a similar result, the only effect of the opposition in that quarter being to require the company to supply gas to the public lamps for 2s. 6d. per 1000 feet, the maximum price to private consumers within the borough being 4s.; and, as the previous contract price was estimated to yield only 2s. 1d. per 1000 feet, the company have gained by the alteration. The Huddersfield Company applied to be empowered to raise their capital to £120,000, but it was limited by the Act to £100,000. The prices proposed in the bill to be charged, were 4s. 6d. within the borough, and 5s. beyond it, but the committee of the Commons reduced the maximum price within the borough to 4s., and raised the standard of illuminating power from 12 sperm candles to 14.

The Portsea Company's bill underwent great enlargement in passing through Parliament. It was originally only a bill to increase the capital and amend the powers of the company; the additional capital required being £58,200, so as to make the whole capital of the company amount to £120,000. In the Act, the amount of additional capital the company are empowered to raise is reduced to £30,000, with power to borrow one-fourth of the whole when that sum is subscribed for. Several clauses are added, relative to the price and quality of the gas, of which nothing appeared in the original bill. The maximum price is fixed at 4s. 6d. for 12-sperm-candle gas, except in the event of increase in the cost of coal or labour, in which cases the price may be raised to 5s. 6d. per 1000 feet; but the improvement commissioners may appeal to the quarter sessions against the advance. The price of gas supplied to the public lamps is not to exceed the prices now charged, and the commissioners may appeal against the present prices. They may also require the gas to be supplied to the public lamps through meters, to be provided by the local authority—not less than one meter being placed to twenty lamps. There is a clause requiring the company to supply gas within 10 yards of their mains, if not more than will pass through a 60-light meter be required for a private consumer. There is also a clause providing that the incoming tenant shall not be charged for the arrears due by the tenant he succeeds.

The bills of the two rival Sowerby Bridge companies have been amalgamated into one Act, the object of which is to confirm the sale of the works of the old company, and of all the rights and privileges of the Consumers Company—which only obtained a certificate of registration in November last—to the local board of Sowerby Bridge. The consideration for the purchase of the old company's works is to be £18,196, exclusive of stores in hand; and the newly-formed consumers company, in consideration for giving up their rights and privileges,

are to be repaid all the expenditure incurred in the formation of the company, including the opposition to the old company's bill. The maximum price of gas supplied within the district is to be 4s. 2d., and beyond the district 5s. per 1000 feet. The illuminating power of the gas is fixed at 12 sperm candles; and, when the works come into the possession of the local board, the gas may be tested by a person to be appointed by two justices on the requisition of not less than five consumers. In case the illuminating power be found not equal to the required standard, the local board is to be liable to the forfeiture of any sum the justices may think fit, not exceeding £20. Nothing is said about the purity of the gas.

The bill for reincorporating the Swansea Gas Company, when introduced, contained no clauses relating to the price, or quality, or the supply of gas. Such clauses have been inserted in the Act. The price of gas within the borough is fixed at 4s. per 1000 feet, and without the borough at 5s. 6d. The public lamps are to be supplied with gas at the same price per 1000 feet as charged to the largest consumer; and there is a proviso that the local board may contract with the company for a supply of gas otherwise than by meter. The illuminating power of the gas is fixed at 11 sperm candles, the local board being empowered to appoint a person to test it at the town-hall, or at the works. The company are bound to supply gas within 60 feet of their mains.

The Uxbridge Gas Consumers Incorporation Act contains several provisions not included in the original bill, some of which have been evidently introduced at the instance of the local board, and consented to in order to remove opposition. A clause is inserted limiting the dividend of 10 per cent. allowed by the Gas-Works Clauses Act, to the original shares; the dividends on the other shares to be 7½ per cent., unless larger dividends shall be necessary to make up the prescribed dividend in former years; but no deficiency is to be made up beyond three years. One clause prohibits the company from laying down mains through the land of a private individual without his consent, and several clauses are introduced to prevent the contamination of the water supplied by the local board. The price of gas within a circle of one mile from the works is limited to 5s. 6d. per 1000 feet, and in places beyond to 7s. The illuminating power is to be 12 sperm candles, and the mode of testing the purity of the gas is adopted from the Metropolis Gas Act. Power is given to the Consumers Company to purchase the works of the old Uxbridge Gas Company.

The Act giving additional powers to the Victoria Docks Gas Company to purchase lands, &c., contains a clause not in the original bill, extending the provisions of the Gas-Works Clauses Act, as to the fouling of water, to the river Thames.

The Act granting further powers to the Weston-super-Mare Company, and for extending their limits for supplying gas, varies in only one particular from the bill. The price of gas is limited in both to 6s. per 1000 feet; but the Act provides that, after the expiration of any existing contracts for lighting the public lamps, the company shall supply gas for that purpose at a price not exceeding the lowest price charged to private consumers. There is no provision respecting the illuminating power of the gas. The company are empowered to add £16,000 to their present small capital of £8000.

The Act incorporating the Whitworth Vale Gas Company (Limited) differs only from the original bill in the standard of illuminating power, which is fixed at 12 sperm candles, instead of 11, as in the bill. The maximum price is 6s. per 1000 feet. The capital of the company is to be £30,000.

The opposition offered by the local board of Wigan to the incorporation of the Wigan Gas-Meter and Fitting Company, and their amalgamation with the Wigan Gas Company, ended in a compromise, by which the company agreed to most important alterations in their bill. The quality of the gas, as proposed, was only 10 sperm candles, with a uniform maximum price of 5s. 6d. per 1000 feet; but, in the Act, the standard of illuminating power has been raised to 18 sperm candles, for which the price is limited, within a radius of one mile from the works, to 4s. 2d., and beyond that distance to 5s. 6d. Thirteen clauses have been inserted to prohibit the company from interfering with the sewers of the local board, to protect the water-pipes, to prevent the contamination of the water, and requiring the company to furnish maps of the district, showing the directions and extent of their lines of mains. Five other clauses have also been introduced, providing for the sale of the undertaking to the local board, if the sanction of three-fifths in number and value of the shareholders can be obtained.

The Macclesfield Company's bill was withdrawn. Its object was to fulfil certain conditions imposed by the Macclesfield District Gas Act of last session, which, if not complied with, would have compelled the company to sell their works to the local board. An arrangement was made after the bill had passed the House of Lords, by which the company accepted an offer of the board to pay twenty-five years purchase for their undertaking.

A bill for incorporating the Aldershot Gas Company was thrown out for non-compliance with the standing orders.

The gas movement in Scotland appears to be approaching a state of rest, and Mr. Flintoff has been looking about to find another field for his exertions. He has fixed on Newcastle-upon-Tyne as a fitting place to give him encouragement; and, as coal is cheaper there than elsewhere, he contends, in opposition to his co-agitators in the south, gas ought also to be supplied there at a cheaper rate than in other towns. He is writing a series of letters to one of the Newcastle papers, endeavouring, by his facile mode of calculation, to show what is the cost of manufacturing gas, and the price at which it should be sold. The conclusions at which he has arrived are: that the cost of the raw material for producing gas at Newcastle is 4¼d per 1000 feet; and that, including labour, and all other charges, leakage, and interest on capital, the price of gas ought to be 2s. 3½d., instead of 4s., as at present. He then asserts that new and improved works might be constructed for half the money the old ones cost, and that "the dividend obtained would pay about 27 per cent. on the modern outlay." Such exaggerated statements show how little reliance is to be placed on Mr. Flintoff's estimates. He attempts to throw doubt on the amount of capital on which dividends are paid by the Newcastle Gas Company, which is stated in their accounts to be £128,000; and he alludes to a parliamentary return in 1850 of the same company, in which the capital is represented to be £65,000. But, he does not seem to be aware that the company have recently erected entirely new works at Elswick, near Sir W. Armstrong's factory, and laid new mains in the town, which expenditure has caused a large increase of the capital. It may be observed, however, that the circumstances of the gas supply at Newcastle afford some pretext for Mr. Flintoff's agitation. The two companies that formerly competed for the supply of gas amalgamated without having obtained statutory powers, and the existing company are not subject to the Gas-Works Clauses Act, are not limited in the price charged or dividends paid, and there is no standard of illuminating power or of purity. Mr. Flintoff, again, adduces Whitehaven as a model town for the supply of gas, and asserts that, if gas can be sold there for 2s. per 1000 feet, it ought to be sold for still less at Newcastle—without, however, mentioning that the newly-formed Consumers Company can pay no dividend, though charging 2s. 6d. In reference to that company, it is due to Mr. Flintoff to correct an error in the last number of the JOURNAL, in which we inadvertently gave him the credit of having, by his advice and direction, established the Consumers Company at Whitehaven; whereas, in point of fact, he had nothing to do with it.

We understand that the companies who supply gas within the City of London have agreed to raise the price for gas from the present low rate of 4s. to the same scale that is charged in the metropolis generally—viz., to 4s. 6d. per 1000 feet—in accordance with the Metropolis Gas Act. The new arrangement is to come into operation on the 29th of September next.

Correspondence.

THE METROPOLITAN BOARD OF WORKS AND THE SALE OF GAS ACT.

SIR,—Referring to the observations in your JOURNAL of the 13th inst., respecting the Sale of Gas Act being carried out in the metropolis by the Metropolitan Board of Works, wherein it states, "It is quite certain that such a staff [three inspectors] will be totally inadequate for the purpose of carrying the Act into operation, and that much confusion and inconvenience will be the consequence of attempting it with such inefficient means;" and, further on, stating that, "The board, however, deserve credit for the prompt manner in which they have taken the matter up, and we trust that no parsimonious feeling will interfere with giving the measure a fair trial"—there is, no doubt, great credit due to that board for doing *something* promptly; and it is to be hoped that it will not only act promptly but efficiently, as the emergency is great.

I fear, however, that the Metropolitan Board does not see the

importance of making, not only *prompt*, but at the same time *ample* provision, for carrying out the Act at this season of the year, when every day's delay is of consequence, as the stamping of meters for stock, preparatory to the large demand that will soon be made for stamped meters, to meet the emergency of the forthcoming winter season, should be commenced at the earliest practicable period.

Taking much interest in this question, I wrote to the Metropolitan Board, previous to its last meeting, suggesting the desirability of purchasing the surplus gasholders which are already stamped for the City of London, and which will not now be required in the City, if the Metropolitan Board of Works does its duty in providing ample means for stamping meters within the several districts of the metropolis outside the City. I also suggested that the two gasholders now used by Mr. Mills, on the Surrey side of the Thames, should (if possible) be purchased, and altered to comply with the requirements of the Exchequer-Office, and stamped without delay; and, further, that the requisite number of inspectors should be at once appointed. These were, of course, merely suggestions on my part, for the consideration of the board.

The board, however, decided at its meeting to advertise for three inspectors, to order three 10-feet and three 1-foot gasholders to be made, and the meeting then adjourned till the 20th of September, or to within twenty-three days of the time when the Act comes into operation, wherever it has been adopted in the United Kingdom. In those twenty-three days, it will have to appoint inspectors, to procure and fit up premises with the requisite apparatus for testing meters, and to stamp a sufficient number of meters (if it were possible to do so) to meet the immediate demand; as, after that date, no meter can be fixed in the metropolis under a penalty of £5, unless it is first verified and stamped by an officer appointed under the Act.

Now, let us see what the facts are that the Metropolitan Board has to deal with, and how far its present views of the subject are likely to meet the emergency or otherwise.

In the first place, according to the statistics obtained from authentic sources by the Middlesex magistrates, there are (on the average) 70,000 new meters made per annum in London, *on the north side of the Thames.*

In the second place, according to the statistics obtained from authentic sources by the Surrey magistrates, the inspector of meters in Southwark (with an assistant) has only tested and stamped, on the average, 6634 meters per annum for some years past, and their time has been fully occupied.

Now, divide 70,000 by 6634, and the result will show that it will require more than ten inspectors to test the *new* meters made on the north side of the Thames alone, to say nothing of those made on the south side—or of the old meters taken down and repaired, and which have to be re-tested before being fixed again—or of those meters which consumers or gas companies may require to be taken down and examined. This estimate, too, is based upon meters being submitted only to the ordinary tests to which they have hitherto been subjected; whereas, the Act lays down more stringent rules, which will require much longer time to carry out. There cannot, therefore, be so many tested within the same time, in the manner required by the Act, as there were upon the old system; but, nevertheless, following out the results of the old system, for argument's sake, as being within the mark, and having these facts on which to base my observations, I will now take another view of the case.

If 6634 meters per annum are a fair average year's work for one inspector and his assistant, or 21 and a fraction meters per day (reckoning 313 working days per annum) for each inspector and his assistant on the old system, the three inspectors proposed to be appointed by the Metropolitan Board of Works will only be able to prove 63 meters and a fraction per diem. Now, dividing the 70,000 *new* meters made in the metropolis north of the Thames by 63 (disregarding fractions)—the average number that might fairly be taken as three inspectors work with an assistant each—on the old system, will give 1111 days, or 3 years (of 365 days), and 16 days to get through one year's manufacture of *new* meters in the metropolis *on the Middlesex side of the Thames alone*, exclusive, as before stated, of those made on the Surrey side, and of the old meters repaired (which will amount to a very large number), and of those now fixed, and which may be taken down for examination.

I think the foregoing facts, which are based on official statistics now before me, prove beyond doubt that the Metropolitan Board of Works should not only act much more promptly than they are doing, but also that they should take a much more enlarged view of the question than they seem at present to be prepared to do; otherwise, there will be a most serious inconvenience felt, not only in the metropolis, but throughout the country at large, from the insufficient provision made for carrying out the duties imposed upon it.

WILLIAM CROSLEY.

103, *Southwark Bridge Road, Aug.* 19, 1861.

Register of New Patents.

348.—RICHARD ARCHIBALD BROOMAN, of 166, Fleet Street, London, patent agent, for "*An improved gas apparatus, intended chiefly for lighting pipes, cigars, and cigarettes.*" A communication. Provisional protection only obtained. Dated Feb. 11, 1861.

This apparatus is connected by a flexible tube to a gas supply-pipe, and is intended for keeping a minimum supply of gas constantly alight, which may be increased on holding up the apparatus sufficiently to enable a smoker to light a pipe or cigar, or tobacco in any other form, or to enable any person to increase the flame and light for any other purpose.

A holder, which can be grasped in the hand, supports a burner, the passage to which is provided with a key, which extends in the form of a hollow bent tube, and terminates in the mouth of the flexible tube in communication with a gas supply-pipe. A screw in the centre of the holder regulates the extent to which the key may be opened. The passage of the gas to the burner cannot be wholly shut off, and the minimum supply is maintained. When the holder is at rest, by simply holding it up, the key turns in its seat, increases the supply, and consequently the flame and light. The burner is surrounded by a gallery for holding a chimney, which is lower on one side than the other, to afford facility for lighting a cigar, cigarette, or pipe.

403.—JAMES BAILEY HAWKINS, of North Street, Limehouse, London, plumber, for "*Improvements in the construction of cocks for drawing off liquids and vapours, and for regulating the flow or passage thereof.*" Provisional protection only obtained. Dated Feb. 19, 1861.

This invention relates to cocks intended to be employed for drawing off liquids and vapours from vessels or reservoirs containing the same, or for regulating or cutting off the flow or passage thereof, and consists in so constructing such cocks as to prevent the fixing or setting of the plugs thereof in their seats, which is a common objection attending cocks constructed with plugs. The means by which it is proposed to remedy this objection, according to this invention, and also with a view of simplifying the construction of cocks, and of rendering the same more efficient and certain in their action, is by making the same as follows; that is to say, a hollow casting or shell, with three outlets, for example, of the shape of the letter T, is formed, the longest arm representing the inlet and outlet-passages; and the shorter arm is intended to be employed as the seat for cutting off or opening the communication between the inlet and outlet-passages, for which purpose the outlet-passage turns downwards for a short distance into the aforesaid shorter arm. Against the knife or rounded edge of the downward part of such said outlet, a cup-shaped piece of metal, fitted with a piece of india-rubber, leather, or soft metal, is made to press by means of a screw-stem, formed on the said cup-piece, and passing through a hole in a cap screwed on to the end of the aforesaid short arm. Into this screwed cap a diaphragm of india-rubber is fitted, which presses against a washer, so that, when the communication between the inlet and outlet-passages is cut off, the pressure of the liquid on the aforesaid diaphragm presses the same around the before-mentioned screwed stem, and thus prevents the escape of the liquid around the stem. When the aforesaid cup-shaped piece is withdrawn, or unscrewed from the end of the outlet-pipe, the liquid then flows through the same. The position of the aforesaid cup may either be vertical or horizontal, according to the description of cock required to be made. In all cases, it is the material in the cup pressing against the edge of the inner end of the outlet passage that cuts off the communication by screwing the same tightly against such said edge; and it is this novel and peculiar mode of constructing this part of cocks, instead of employing a plug, and the connecting of the cap to the shell of the cock by a knife-edge setting, that constitutes this invention.

APPLICATIONS FOR LETTERS PATENT.

2000.—HUGH GREAVES, of 22, Abingdon Street, Westminster, Middlesex, civil engineer, for "*Improvements in apparatus to be employed for the water conveyance and delivery of coals, and other materials.*" Aug. 12, 1861.

2014.—NICHOLAS COMMON, of Brighton, Sussex, engineer, for "*Improvements in apparatus applicable to water-closets and urinals.*" Aug. 13, 1861.

2024.—EDMUND EDWARDS, of 13, Beaufort Buildings, Strand, London, for "*Improvements in machinery or apparatus for separating mineral ores, coal, and other substances, from impurities.*" Aug. 14, 1861.

2026.—WILLIAM WILDS, of Hertford, Hertfordshire, architect and surveyor, for "*Improvements in apparatus for ventilating.*" Aug. 14, 1861.

2057.—EDMUND SMALL CATHELS, of Shrewsbury, Shropshire, gas engineer, for "*Improvements in compensating gas-meters.*" Aug. 19, 1861.

2071.—JOHN SOMERVILLE, of Maidstone, Kent, gas engineer, for "*Improvements in apparatus for drilling and tapping gas and water-mains and pipes, and in preventing leakage therefrom.*" Aug. 20, 1861.

2075.—FREDERICK GYE, of the Royal Italian Opera, Covent Garden, for "*Improvements in constructing gasometers and gasometer tanks.*" Aug. 20, 1861.

2083.—WILLIAM CLARK, of 53, Chancery Lane, Middlesex, engineer and patent agent, for "*Improvements in optical and illuminating apparatus.*" A communication. Aug. 21, 1861.

GRANTS OF PROVISIONAL PROTECTION.

1659.—JAMES BAILEY HAWKINS, of North Street, Limehouse, Middlesex, plumber, for "*Improvements in the construction of cocks for drawing off liquids and vapours, and for regulating the passage thereof.*" June 28, 1861.

1748.—JOSHUA KIDD, of 289, Strand, Middlesex, civil engineer, for "*Improvements in the manufacture, application, and combustion of gases, and in apparatus connected therewith.*" July 11, 1861.

1912.—HENRY SHAW, of 40, Lower Ormond Quay, Dublin, printer, for "*Improvements in wet gas-meters.*" Aug. 1, 1861.

1924.—GEORGE BISH, of High Street, Stratford, Essex, engineer, and JAMES DREDGE, of 11, Adam Street, Adelphi, Middlesex, civil engineer, for "*Improvements in forming bends, and other forms or parts of non-metallic pipes, and in machinery or apparatus employed for such purposes, part of which improvements are applicable also to the formation of bends or curves in some kinds of metallic pipes.*" Aug. 3, 1861.

1939.—HERMANN CHRISTIAN MEYER, of Hoxton, Middlesex, engineer, for "*Improvements in slide-valves to regulate or stop the flow of water, steam, or other fluid.*" Aug. 5, 1861.

NOTICES TO PROCEED.

894.—CHARLES NOYES KERNOT, of Gloucester House, West Cowes, I. of W., Southampton, gentleman, and MARTIN DIEDRICH RUCKER, of 116, Fenchurch Street, London, gentleman, for "*Improvements in the method of obtaining ammoniacal salts, and other valuable products, from liquors or substances containing ammonia, and for utilizing the residuum.*" April 11, 1861.

948.—HUGO CARSTANJEN, of Cologne, for "*Improvements in the apparatus for, and method of, increasing the illuminating power of gas.*" April 18, 1861.

Miscellaneous News.

COUNTY AND GENERAL GAS CONSUMERS COMPANY, LIMITED.

On Thursday last, the Fourth Ordinary Half-Yearly Meeting of this Company was held at the offices, 76, King William Street—E. H. J. CRAWFORD, Esq., M.P., in the chair.

Mr. R. S. PARKER (the secretary) having read the notice convening the meeting, and also the minutes of the last general meeting, read the report for the past half year, and statement of accounts, which were as follow:—

The directors, in submitting the balance-sheet and accounts for the half year ending on the 30th day of June, 1861, have much pleasure in drawing attention to the continued satisfactory progress of the business of the company.

During the past half year, 1304 shares have been disposed of, producing, together with calls on shares previously allotted, an addition of £7616 to the paid-up capital of the company. Of this sum, £2500 has been applied in liquidation of liabilities of the company. The construction of new gasholders, and extensions at various works, have added £2678 to the capital account. At the same time, the directors have been enabled to provide ample stocks for the ensuing winter season, and have a large cash balance in the bankers hands.

After providing for the Christmas dividend, interest on loans, and all other outgoings for the past half year, and several items as appropriated at the last annual meeting, a total profit has been realized of £832. 15s. 2d. Out of this sum, the directors have added £50 to the reserve-fund, and have written off £20 from preliminary expenses, and £20 from law charges; leaving a balance of £742. 15s. 2d., sufficient to pay a dividend for the half year ending June 30, 1861, at the rate of 6 per cent. per annum, and to carry forward a surplus, unappropriated, of £114. 15s. 6d.; and the directors recommend the declaration of a dividend accordingly, to be made payable on and after the 16th of September next.

Dr. *Balance-Sheet, to June 30, 1861.* *Cr.*

CAPITAL AND LIABILITIES.					PROPERTY AND ASSETS.				
Capital—					Property held by the company—				
Received from sundry shareholders, viz.:—					Leasehold buildings and plant at Northfleet, Pater, Pembroke, and Lea Bridge			£16,339	12 5
£5 per share on 2930 ordinary shares				£15,299 0 0	Freehold buildings and plant at Walton, Chertsey, and Ware			13,140	19 5
4	135	"	"						£29,480 11 10
1	100	"	"		Stock in trade at sundry works			£2,192	3 0
5	1483	preference shares			Office furniture and fittings			113	18 7
3	392			8,816 0 0					2,306 1 7
2	100	"	"		Items of expenditure to be liquidated out of revenue by instalments, under Act, No. 71, viz.:—				
1	25	"	"		Preliminary expenses			£1,250	0 0
Total shares on register	5165			£24,106 0 0	Law charges			213	13 2
Debts and liabilities—									1,463 13 2
Debentures and loans			£2,614	12 0	Debts due to the company—				
Mortgages on sundry works			4,000	0 0	Bills receivable, and sundries			£1,041	0 0
Balance of purchase-money of Ware Works, as per contract, to be paid off by annual instalments over a period of five years			2,700	0 0	Gas and meter rental, &c., in course of collection by district agents			2,136	1 6
Acceptances for goods supplied			1,413	18 0					3,177 1 6
Tradesmen and sundries			1,632	19 4	Cash—				
Unclaimed dividends			36	11 3	Cash at bankers			£1,105	5 9
				12,398 0 7	Petty cash—balance in hand			4	1 11
Reserve-fund				200 0 0					1,109 7 8
Profit and loss				832 15 2					
				£37,536 15 9					£37,536 15 9

Dr. *Profit and Loss Account.* *Cr.*

To Amount appropriated, as per directors report of the 23rd of February last:—					By Balance, from Dec. 31, 1860		£841 14 9
Reserve-fund (this sum added)	£156	13 1			Gas and meter rental	£2,784 9 0	
Preliminary expenses (written off)	38	12 9			Products and sundries	548 4 8	
Law charges	20	0 0					3,332 13 8
Furniture	12	9 0					
			227	14 10			
Dividend declared at meeting held on Feb. 28, 1861			475	12 4			
Coals carbonized	£1,131	9 3					
Lime and purifying materials	49	0 11					
Wages and labour	458	13 7					
Retorts	63	13 11					
Rent of sundry works	143	0 0					
Local rates and taxes	57	2 9					
Commission and agency fees	95	13 4					
Miscellaneous and petty charges at works	104	17 11					
			2,103	11 8			
Office expenses, including directors and auditors fees, rent of offices, salaries, and petty expenses	£242	19 1					
Stationery and advertising	49	11 8					
			292	10 9			
Interest account			242	3 8			
			£3,341	13 3			
Balance—profit			832	15 2			
			£4,174	8 5			£4,174 8 5

Appropriation of Balance.

Reserve-fund	£50 0 0	
Preliminary expenses	20 0 0	
Law charges	20 0 0	
	£90 0 0	
Dividend at 6 per cent. per annum	627 19 8	
	£717 19 8	
Surplus to profit and loss—new account	114 15 6	
	£832 15 2	

The CHAIRMAN: Gentlemen, I have now to ask you for your approval of this report and statement of accounts. You are aware that the half year which has just transpired is the least profitable one, not only for us, but for all other gas companies. We have shorter nights during the summer months, and therefore our in-comings are less profitable than during the half year ending at Christmas. But, notwithstanding that drawback, I am happy to say there are features connected with our proceedings during the past half year which serve satisfactorily to show that we are progressing in the proper way, and must afford the fullest confidence to our shareholders. Let me explain this in a few words. Last year, we had a balance of £841. 14s. 9d.; the balance at present comes close upon its heels, for we have to divide a total of £832. 18s. 2d. The one balance, therefore, is equal to the other, with the small difference only of £9; and, when we come to investigate the state of our accounts, the cause of that difference appears even more satisfactory. Our working expenses for the last half year, partly owing to our retort-charges, the increased price of coals, and other incidental outlays, were £77 more than they had been in the last half year. There was an addition also of the office expenses to the amount of £100. That was partly owing to an increase made in the salary of our worthy and efficient secretary, Mr. Parker. The increase, too, of our paid-up capital has added to the charge we have to make for dividend. Comparing all these items this half year with those we had previously, and looking at all these additional expenses, we find that there has been an increase of £200 in the charges, and yet there has only been the small sum of £9 short in the amount of our profit. This shows that, if we are not progressing rapidly, we are, at all events, going on satisfactorily. There is only one item in the accounts which seems to require a word of explanation. In the statement of the debts due to the company, there is a sum of £1041; I believe that all that amount, with the exception of about £20, has been since realized. A portion of that had reference to shares which were disposed of, and another portion consisted of calls due, which have since been paid: but now, I am happy to say, only £20 of the entire sum is outstanding. If there be any other item in the accounts upon which further information may be considered desirable, I shall be most happy to afford it. With these few observations, I will conclude by moving "That the report and accounts be received, adopted, and printed for circulation."

Mr. CLARKE seconded the motion, which was put and carried *nem. con.*

The CHAIRMAN: Gentlemen, it has been very wisely provided by the Legislature that the directors of public companies should not propose a dividend without the sanction of the shareholders. We adhere to that rule; but we never have any dissentients, because we always find that they agree to our proposition of giving them a dividend of 6 per cent. per annum. I would propose that dividend now, only that I believe it would come more appropriately from somebody else than from me.

Mr. WILLIAMS: I have great pleasure, sir, in proposing that the dividend for the past half year be declared at the rate of 6 per cent. per annum, payable on and after the 16th of September next.

Mr. GARNER seconded the proposition, which was unanimously agreed to.

The CHAIRMAN: That is the whole of our business at present, the election of directors and managers being at our meeting in March.

Mr. WILLIAMS: Though our meeting is small, in point of numbers, yet we ought not to separate without passing a vote of thanks to our chairman and directors. I must say that our balance-sheet is exceedingly satisfactory, and that I hope we shall go on in the same progressive manner in which we have hitherto done. I have much pleasure in proposing that a vote of thanks be accorded to the chairman and the directors.

The motion having been cordially agreed to,

The CHAIRMAN said: Gentlemen, on behalf of my colleagues and myself, I beg respectfully to return you our sincere thanks. I can assure you that we have done all we could to promote your interests, and that we shall continue to do so with the view of advancing the prosperity of the company. We are exceedingly glad to find that our labours are appreciated by the shareholders; and we believe that, "by a long pull, a strong pull, and a pull altogether," we shall be able to advance still further our individual interests. I cannot close the proceedings without expressing my own feelings, and those of my brother directors, in favour of the support we have received from the officers of the company. I may truly say that, without them, we should be without hands; and, when speaking of them generally, I cannot forbear from alluding more particularly to our able and efficient secretary, to whom we are chiefly indebted, and whose books are a pattern of excellent bookkeeping. With reference to our engineer, I need only observe that the results of his works speak for themselves. A more trustworthy officer it would be impossible for any company to have, and I may say the same with regard to all our officers. They are zealous, active, untiring, and energetic, and highly deserving of the thanks of the shareholders generally.

The proceedings then terminated.

PHŒNIX GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of this Company was held at the Bridge House Hotel, London Bridge on Wednesday, the 21st inst.—J. E. JOHNSON, Esq., in the chair.

Mr. PRIDDEN (the secretary) commenced the proceedings by reading the advertisement convening the meeting. He also read the minutes of the last general court, and of special meetings held on the 8th of May, the 12th of July, and the 31st of July last.

The whole of these proceedings having been confirmed,

The CHAIRMAN said, a large number of special meetings had been held during the past half year, all of which had arisen under circumstances over which the directors had had no control. He wished to know whether the shareholders would take the printed report and statement of accounts as read? A copy of that report and those accounts had been circulated; and, perhaps, they were both better understood already, than any mere perusal would now render them.

Mr. JOHN BOX asked whether the taking of them would preclude any shareholders from commenting upon the items?

The CHAIRMAN replied, certainly not.

The report and statement of accounts (which were inserted in our last number) were then taken as read.

The CHAIRMAN: Gentlemen, that part of the preliminary business having been disposed of, now comes the first resolution, which I will take the liberty to propose. That resolution partakes something of the character of a roving commission, because on it many comments may be made; and it is purposely drawn up in general terms, in order to elicit discussion, and to obtain the opinions of the proprietors at large. It is this—"That the report and statement of accounts be received and entered on the minutes." I do not ask you to declare all at once that these accounts are correct, but to receive them, and direct that they may be entered. If you should happen to disapprove of any part of them afterwards, you will say so by your votes, and the directors will endeavour to meet your wishes. I will now, if you please, take the liberty of adverting to the accounts generally. The first item is usually coals. It is always a very heavy item; it is, too, a most important one. I am sorry to say we have been obliged to pay a considerably higher sum this half year for coals than we had in any preceding half year. I have some reason to fear that, during the ensuing half year, we shall not have to pay less than we have paid now; on the contrary, it is quite possible that we may have to pay, perhaps, a little more. Gentlemen, we cannot control these things. Heavy freights will take place, in spite of us. Such, then, is the fact—that we have paid nearly 1s. per ton more for our coals this half year than we had to do heretofore, and that our rental from the produce of those coals has not been as proportionably good as we could have desired. There are, indeed, some explanations upon this point, which it may be desirable to render. In the first place, during the first quarter of the last half year, we were charging prices which prevailed during the quarter which preceded it, and during the second quarter we were charging a reduced price, but, during the whole of this half year, we were charging the reduced price. The amount of rental is, therefore, lower than it was—less than it really ought to have been; and I am sorry to confess that this was, in part, occasioned in consequence of our not having produced a very good manufacture. Our attention has been specially directed to this circumstance. The directors do not find everything going on quite right. Some little obstacles will occur at times in a large undertaking of this kind, but our attention has been turned to them, and that attention will continue to be given until the proper remedy be found. I refer to these matters in the hope that gentlemen will not ask me questions about waste, because the waste we have had this half year is more than it ought to be, and more, I hope, than it will be again. The tradesmen's bills have been about the same as they were before. They range at about £6900. The law expenses are considerably less than they were last half year. Meters and repairs are also less, but that arises in part from the form in which the accounts of the company are now kept. The Secretary of State asks whether we have provided any new meters out of revenue? We wish, of course, to show, in reply, that we have not—but the fact is, that every additional meter to supply new customers is taken out of capital; and, though the sum entered under this head is less than it was before, yet you will find, on reference to the capital account, that the amount for meters is really increased. The rent, rates, and taxes, appear to be considerably higher than they were last half year. They are £2600 now against £1600 before, and against £2000 at this period last year; but this is an apparent rather than a real increase. You will recollect that we usually had an item in our accounts called "the investment" item. That is not in the present accounts, but it is taken into consideration in the matter of your rents, and the reason is this:—We hold a considerable amount of leasehold property; and, while we had no partners, it was quite right that we should put down the item for investment; but, now that the public have become proprietors, now that the consumers have become our partners, and now that it has become essentially necessary that our accounts should be kept with the strictest accuracy, therefore, while dealing formerly with this fund in a separate manner, yet now finding it necessary to be strictly accurate in every particular, we have taken the value of these holdings by an actuarial valuation, and we are assured it will require £1200 per annum to be put aside and invested continually in order to secure to you a return for your capital on the termination of the leases. We have put £600 down, therefore, for this purpose this half year under the head of "rent;" and we have done it in that form for this reason:—Under the statute, the Gas Clauses Act, there is a provision that the proprietors may receive 10 per cent., and may invest out of an investment-fund, and so on; but we have not thought it right to call it an "investment." We call it "rent," for distinction sake. It is a mere matter of form; but this explanation will serve to account for the increase which appears in the item of rent. Salaries is the next item in the accounts, and they are higher than they were last half year, but then the return from carbonized materials is higher also. Wages are a little higher. Bad debts, I am sorry to say, have increased to £556, against £336 last half year. Probably, you will be of opinion that, after all, this is not a very large amount when you are dealing with a rental of £63,000. It is not a very large per centage. It comes to about 3¾d. on every ton of coal you carbonize. There are circumstances under which an incoming tenant undertakes to pay all liabilities; but, sometimes, when we make a claim, we are not able to prove that undertaking, and, therefore, we are obliged to submit to some loss, but it is not, certainly, a very serious one. A portion of this item of bad debts is made up in another way. There are some persons who come to us with their accounts; those accounts are for pounds, shillings, and odd pence. They will draw a cheque for the amount, omitting the pence, and we do not quarrel with them; and in that way we sustain some loss. The next item is "balance of interest, £209;" and, when referring to this, I am sorry to tell you that we have been obliged to resort to our bankers, and to draw upon them somewhat largely during the last half-year. At Christmas, we were obliged to go to them for something like £20,000, and it was not until the month of May that we were enabled to pay that amount off. Since then, we have not been in debt to our bankers, but now we are borrowing from them a sum of £10,000 to pay off the dividend on the present occasion. That, however, is the result of the enormous amount of money which has been expended by the directors on new works, without coming to the shareholders for any assistance. We did, indeed, make a call some time ago, but then that was money we had in our hands, and upon which no dividend was paid. We thought it right that you should have the dividend upon it, and you have had it. I have already stated that there is no investment-fund, and explained the reason.

Mr. JOHN BOX: Where is the money invested?

The CHAIRMAN: We have £5500 in bonds and securities. The next feature in the accounts is the absence of the item of "depreciation." This is an item which has appeared in the accounts for many years; but, on this occasion, it has disappeared altogether. There is a question in the minds of the directors as to whether there ought not to be an amount set apart every year for depreciation. No doubt, the property does depreciate, and depreciates somewhat more than any mere repairs will probably meet. The directors, however, have some doubt, seeing now that the consumers are partners, as to whether they can take any amount for depreciation; and, if any, what? All I can say is that we are acting with the greatest possible care and caution, and that, instead of putting down a sum in the accounts for depreciation, we have allowed that question to stand over for consideration. Then, we are now offering 9 per cent. dividend. Perhaps, you will say that, after the payment of the dividend, we are carrying over a large sum to our undivided balance; but what I said on the subject of depreciation will to some extent account for our doing that. That, however, is not the only reason why we limit the dividend to 9 per cent. The directors have never increased the dividend beyond what they paid previously, without being tolerably certain that they could always pay in future the increased amount. They never made an increase hitherto which they did not maintain. And, in now increasing from 8½ to 9 per cent., they believe that they shall be able to maintain it at 9, but they do not think they will be able to carry its increase further, and, therefore, that it would not be judicious to increase the amount too much at present; and, though they are making a call now of £2 per share, they believe they will still want more money, but they are unwilling to call for more at once than is absolutely necessary, particularly as the new buildings will not be fully completed until the winter. These are the reasons why they are now making a call of £2, and paying a dividend of 9 per cent. From the other side of the accounts it will appear that the price we are getting for coke is higher than in the last half year, probably because we are now paying a higher price for coal than we were paying then. The price obtained for breeze is about the same as before. The price of tar is considerably increased, by being double what we obtained before; and, when we know the various purposes to which gas-tar is applied, we may readily believe that that price will still further advance. The ammonia is satisfactory in point of quantity; at least it is fair, and the price is fair also, for it has very considerably increased beyond what it was eight or nine years ago. With these remarks, and holding myself and the directors prepared to answer any question which the shareholders may be pleased to put, I beg to conclude by moving that the report and statement of accounts be received and entered on the minutes.

Mr. JOHN BOX: Before you put the resolution, sir, permit me to ask what leasehold property you have, and where it is situated, and whether the old station at Bankside continues in your possession?

The CHAIRMAN: The lease of the latter is run out, and is no longer in our possession. Our other premises at Bankside are now leasehold.

Mr. JOHN BOX: It was church property, I know, and was considered next to freehold or copyhold. May I ask whether it is not uncertain that there will be a renewal of your lease there?

The CHAIRMAN: You are quite right in saying that it was church property. That property was taken by the directors, in the belief that they might continue to hold it by paying the renewal-fines; but it now appears that the parties did not intend to allow any renewal-lease. The property will, in all probability, cease in forty years hence to be our property.

Mr. JOHN BOX: Do you mean that the property adjoining is freehold, and that the property in Kennington Lane is copyhold?

The CHAIRMAN: Yes; the Kennington Lane property is copyhold.

Mr. JOSEPH BOX: It is worthy of remark that the quantity of coals consumed up to Midsummer was 1711 tons over and above the preceding half year; and, in my view, it is always right and proper to compare corresponding half years, and not to be contrasting those now with others which were long antecedent. The shareholders will find that the decrease in the rental, in proportion to the coals, is £1310.

The CHAIRMAN: The answer to that is this—that we have reduced the price of gas throughout the whole of our district very much.

Mr. JOSEPH BOX: Does not that show that a premature step was taken on the part of the directors in making that reduction? I contend that the directors did certainly commit a mistake—at least, that is my opinion—in reducing the price 3d. per 1000 feet. The question is, whether the additional consumers you hope to obtain will make up for the loss occasioned by it. I maintain that was a very premature step on the part of the directors; but I know not that there is any other fault I can lay to their charge. But that, I consider, is a fault. Now, what is the decrease in the amount of the rental in proportion to the coals used? I will tell you. The

decrease at Vauxhall and Bankside is £3777. There must have been some bad management there, and it is for the directors to ferret it out. At Greenwich, there is a decrease in the rental of £817. These two sums make a total of £4594 less rental produced this half year, comparing it with the corresponding period of the half year ending in the summer of 1860. I think that some satisfactory and clear explanation of that matter is imperatively required. I do not myself pretend to give it. I merely ask for it. On the subject of the call of £2 per share, I will speak presently. Meanwhile, will you excuse me if I say that the increase in the per centage of the unaccounted-for gas at Greenwich is 3½ per cent., and that at Vauxhall and Bankside, it is only 1. We are making a retrograde movement here. For a succession of half years, we have been lowering, and lowering, and lowering; but, now, we seem to be rapidly on the rise. I mention this in passing, but the loss of our rental is the primary point upon which some satisfactory explanation is most necessary.

Mr. WHEELER: I do not think the arguments which have just been advanced by the last speaker are very sound, or that the shareholders will be much influenced by them. If Mr. Box, in the course of his business, were to reduce his price from 4s. 6d. to 4s. 3d., I think he would find at the end of the year that his profits would not be quite so large all of a sudden as they had formerly been. In my opinion, our directors have acted with great wisdom. They have endeavoured to put our works in a very efficient state. For the purpose of making valuable improvements in the manufacture of gas, and of meeting the requirements of the public, and their neighbours, they have made considerable reductions in price, and in so doing they acted, in my humble judgment, perfectly right. I know not who forced them to act in this manner, but, whoever did so, they manifested great good sense in making the reduction, and the whole of the shareholders, if I mistake not, were then, and will be now, of that opinion. In regard to the decrease of rental, that was a thing to be naturally expected; and I can only express my wonder that a gentleman like Mr. Box did not expect a decrease of profits as consequent upon a reduction in charge. But, then, notwithstanding the falling off in receipts, the dividend this half year is increased. If, indeed, the directors had come before us on this occasion and said they would give not 9, but 8 or 7½ per cent., we might be very much inclined to look a little black at them. But that is not so. They offer us 9 per cent. We know not but other companies may force us to reduce the price of gas again. It may be that we shall not be able to keep it up even at the present figure. Still, whatever may be the issue of the future, I am extremely glad to find that the directors are now putting their hands into our pockets in order that they may extend our works, because they probably believe that, by means of that extension, they will be able to pay us hereafter a dividend of 10 per cent. I think the explanations of the chairman were very satisfactory. Still, there was one little point of those explanations to which, perhaps, I might be inclined to take exception. He has buttoned up his treasury, and, instead of giving us 10 per cent., which I think he ought to have given, he has carried the surplus profits to the reserve-fund. I hold that he ought to have given us the 10 per cent.; and then, if it were necessary afterwards to make another call of £1 per share, we should have been satisfied to pay it willingly. But, let that pass. I can only say that every gas company has suffered in the price it has had to pay for coals. Still, our affairs have been improved in the price we have obtained for coke and other materials. I do not agree with the chairman respecting the future price of coal, because I believe that this half year it will not be so high as it has been during the six months through which we have passed. I think the accounts are most satisfactory, and that the proprietors at large will receive them with feelings of approbation; and I have only to hope, in conclusion, that next year our dividend will be 10 per cent.

Mr. RHODES: I believe our coal-stores are not at present in a state to receive a large supply, and that we have no place sufficiently spacious to store any great quantity lately. The law expenses during the last half year appear to be high; and I should like to know what caused their magnitude? Then, since the districting took place, I did not believe that we should have had such a large amount of bad debts as seems to have been the case this half year. Upon these points, perhaps, a little information would be desirable.

The CHAIRMAN: I will answer the points very briefly. With regard to the reduction in the rental, it results from the reduced price we have made in the gas, and some bad management. I have said before that the directors were not quite satisfied with their proceedings, but that their attention was steadily directed to the subject; and I hope that that candid explanation will be deemed satisfactory. I can only say that we shall do our best, and that I sincerely hope we shall not have to make a similar acknowledgment of our shortcomings at the next meeting. The observation as to our not having any place for storing coals is hardly borne out by fact, because we have 12,000 tons in store, and I have no doubt by the commencement of October, when we shall begin to store again, our new coal-store at Vauxhall will be completed. As to what has been said about our law expenses, I certainly thought that, when we had our districting finished, we should have no further legal proceedings, but we soon found that that was not to be the case. We heard, by mere accident, that there was a bill before the House of Commons, which was about to pass a second reading, and which would have given power to a public body to introduce a gas-work in our district. We felt it necessary, by the strongest and most energetic means in our power, to oppose that bill. There was great difficulty in getting anything done at the time, the Easter holidays being on. We did, however, succeed in obtaining a standing. The Government kindly said that it should not be further proceeded with until we had time for full consideration; and then negotiations went on, which ended in the withdrawal of the bill. But that was not done without considerable expense. There were counsel to consult, and lawyers to be paid; and this has principally caused the item of our law expenses—an item which, I hope, will not appear so largely in our next half year's accounts. Then, with regard to what has been said about our bad debts, I cannot entertain the hope that, in a large concern like ours, their amount will ever be very sensibly diminished.

The motion was put and carried.

Mr. HORNER said he had great pleasure in proposing that the largest dividend ever proposed by the directors should now be declared—viz., 9 per cent.

Mr. RHODES seconded the proposition, which was unanimously agreed to.

The CHAIRMAN then moved that a call of £2 per share be made, payable on or before the 21st of October next.

Mr. RHODES seconded the motion.

Mr. JOHN BOX moved, as an amendment—"That the invested fund, amounting to £5500, and £3500 taken from the undivided balances, making together £9000, which is equal to a call of £1 per share, be now appropriated in part payment of the present call of £2 a share."

Mr. JOSEPH BOX seconded the amendment, which was negatived.

The original motion was carried by an overwhelming majority.

Upon the motion of Mr. STEWART, a vote of thanks was passed to the directors; and, upon the motion of Mr. JOHN BOX, a similar vote was passed to the chairman, for the courtesy and ability with which he had answered all objections, and given his very satisfactory explanations.

The CHAIRMAN briefly acknowledged both motions, and the proceedings terminated.

THE PARAFFIN OIL-LAMP EXPLOSION.

The investigation in reference to the death of Mr. Montmorency Durante Stokes, aged fifty-one, late resident at 18, Desborough Place, Harrow Road, who, with his wife, was recently killed by the explosion of a paraffin-oil lamp, commenced on Monday, the 12th inst., and concluded on Wednesday night, before Mr. GEORGE S. BRENT, deputy-coroner for the western division of Middlesex, at the Bank of England, Cambridge Place, Paddington.

Mr. G. H. JOHNSON appeared on behalf of the Paraffin Oil Company, 17, Bucklersbury, City.

Mr. *M. B. Stokes* was the first witness examined. He deposed that the deceased was his father. On the night of the 26th ult., the witness undertook to pour fresh paraffin oil into a paraffin lamp his father had lately purchased. His mother was holding a lighted match in her hand, and she accidentally dropped it into the lamp, which immediately exploded with a hissing noise, shivering the globe and upper part of the lamp into fragments, and scattering the blazing fluid over various parts of the room. It set fire to the window-sash and furniture, which burned in such an alarming manner that two fire-engines shortly afterwards arrived. The flames were, however, soon subdued by the exertions of the deceased and others, but not until deceased and his (witness's) mother had both been frightfully burned, and a large portion of the window-sash consumed. The injuries his father and mother had sustained rendered it necessary to have them immediately removed to St. Mary's Hospital, where the latter died on Thursday week, and the former on Thursday last.

Dr. *Odling*, analytical chemist, of 6, Prince's Place, Kennington Road, on behalf of the Paraffin Oil Company, produced a sample of what was described as the genuine paraffin oil, and also another sample of oil which, it was asserted, had been purchased for the deceased at a shop in Margaret Terrace, Paddington Green. The witness showed that the genuine oil would not ignite by the insertion of a lighted match, and could not possibly explode; but the other sample did explode. It was, no doubt, the cause of the explosion, that the latter had been used.

After a deliberation, the jury asked for an adjournment, which was granted by the deputy-coroner.

On Wednesday, the DEPUTY-CORONER, in reopening the proceedings, said the adjournment was solely for the purpose of ascertaining if the article which, by a most disastrous and unexpected explosion, had caused, not only the death of the deceased, but his wife also, on whom an inquest had been previously held, alleged to have been sold for paraffin oil, was really paraffin oil, or only a dangerous substitute? He could not do otherwise than look upon this inquiry as an important one to the public, and particularly to the poorer classes, considering the recent very large consumption of paraffin oil. He was willing to give the widest scope possible to the case. The important question for the jury to decide was, whether paraffin oil was an article that could or could not be safely used? Dr. Odling, a gentleman experienced in analytical chemistry, had already shown that there was a dangerous article, sold for paraffin oil, which could not be used with safety, and now it was simply for him to inquire whether this was really paraffin oil or not; and he should again examine Mr. M. B. Stokes, son of the deceased, for that purpose.

Mr. *M. B. Stokes*, on being recalled, reiterated his former evidence as to the cause of the accident.

Other witnesses stated that the explosive fluid broke every pane of glass in one window of the room, and spread so rapidly that the sash was completely burned out, and the ceiling blackened, charred, and cracked.

Miss *Stokes* deposed to having purchased half-a-gallon of paraffin oil about two months ago at Mr. Wood's, of Paddington Green.

Dr. *Odling* then experimented with a part of the explosive oil which had been left untouched in the can, and an ordinary sample of the Paraffin Light Company's oil,—first, by showing that the explosive substance gave off an explosive vapour in the ordinary temperature, whereas the latter oil did not; and secondly, with lighted matches, set the explosive oil in a sheet of flame. The company's oil would only burn like a wick. He denied that the explosive substance was paraffin oil. It seemed a dangerous substitute, and to be a petroleum oil; its gravity was but about ·794, but Young's patent paraffin oil was ·820, making the oil that exploded to be 26 degrees lower than that of Young's.

Mr. *Woods*, the retail vendor, was examined at some length. He had been made an agent of the Paraffin Light Company for the sale of their oil since 1859; during that time, however, he was pretty regularly supplied with oil manufactured by another party, from Messrs. Lamb and Palmer, of Old Broad Street, as well as by the company.

In a lengthened cross-examination by Mr. JOHNSON, witness admitted that he did not believe the oil that exploded to be Young's patent, nor did he believe it to be Lamb and Palmer's. He considered both were excellent articles. He had purchased no oil whatever from the company since the 1st of May last, and had been supplied from that time by Lamb and Palmer, and if the exploded oil had been purchased of him it was probably Lamb and Palmer's, which he called paraffin oil, but which was invoiced mineral oil.

Mr. HORNER, as the representative of Lamb and Palmer, said he was prepared to show that their oil, and that of Young's, were manufactured of the same material, and that they had never sent out oil at such low gravity as ·794, but generally from ·815 to ·825.

Mr. JOHNSON said the fact was, the Paraffin Light Company were the patentees of the paraffin oil, and no other oil was called by that name until after its introduction, about five years ago. It now got into such general use that other people were induced to bring forward other oils and call them paraffiin, although, perhaps, they were of a highly dangerous character. The Paraffin Light Company decidedly objected to any other oil but theirs being called paraffin.

The DEPUTY-CORONER briefly summed up, and

The JURY, after a deliberation, returned the following verdict:—

"That, on the 8th of August, Montmorency Durant Stokes did die from the mortal effects of burns and other injuries of divers parts of his body, occasioned by his having become burned by an explosion of the vapour of a certain substance called paraffin oil, but which was not the paraffin oil sold by the Paraffin Light Company, and that the explosion aforesaid, and the death of the said Montmorency Durant Stokes, were caused accidentally and by misfortune."

Share List of Gas Companies.

(Directors and Managers of Gas-Works are earnestly requested to enable us to rectify the errors and fill up any omissions in the following List.)

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£	**ENGLAND.**	£ s d	£ s d	£ s d
360	5	Aberavon (Lim.)	5 0 0	6 0 0	5 0 0
		Aberdare			
		Abergavenny			
400	5	Abergele (Lim.)	5 0 0	4 0 0	5 0 0
		Aberystwith			
530	10	Abingdon	10 0 0	6 0 0 & Bns.	12 0 0
1050	10	*Accrington Gas & Water*	10 0 0	of £3.	15 0 0
1050	10	Do., new shares	10 0 0		15 0 0
2100	5	Do., do.	5 0 0		7 10 0
2100	5	Do., do.	1 0 0		1 10 0
2100	2½	Do., do.	0 10 0		0 15 0
1000	5	Airdale (Limited)	5 0 0	8 0 0	7 10 0
200	5	Do., new shares	1 15 0	8 0 0	
24	75	Alcester	75 0 0	4 0 0	80 0 0
128	10	Aldborough (Lim.)	10 0 0	5 0 0	
360	6	Alfreton	6 0 0	5 0 0	5 10 0
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	10 0 0	12 0 0
1600	5	Altrincham	5 0 0	6 0 0	6 0 0
		Amersham			
170	10	Ampthill	10 0 0	4 0 0	9 0 0
350	10	Andover	10 0 0	6 0 0	11 12 6
358	5	Appleby	5 0 0	2 10 0	2 15 0
230	10½	Arundel	10 10 0	10 0 0	10 10 0
250	10	Ashbourne, Derby.	10 0 0	6 0 0	13 10 0
292	5	Ashburton	5 0 0	5 0 0	
84	30	Ashby-de-la-Zouch.	30 0 0	6 0 0	
700	10	Ashford (Limited), Kent.	10 0 0	6 0 0	11 10 0
1600	30	*Ashton-under-Lyne.*	30 0 0	10 0 0	60 0 0
590	5	Atherstone	5 0 0	9 0 0	8 10 0
		Attleborough			
		Axminster			
200	20	Aylesbury	20 0 0	5 0 0	21 0 0
150	10	Aylsham (Limited), Norfolk	10 0 0	5 0 0 & Bns.	12 10 0
3093	10	*Bacup (Rossendale Union)* ordinary	10 0 0	9 0 0	18 0 0
600	10	Do., preference	10 0 0	9 0 0	18 0 0
2597	10	Do., new issue	3 0 0	9 0 0	6 0 0
		Bakewell			
200	10	Baldock	10 0 0	5 0 0	10 0 0
1000	10	Banbury (Limited)	10 0 0	7 10 0	15 0 0
2150	10	*Bangor Gas & Water.*	10 0 0	5 0 0	10 0 0
260	10	Barnard Castle	10 0 0	5 10 0	10 15 0
800	5	Barnet	5 0 0	6 0 0	5 10 0
		Barnsley £6000		7 10 0	
109	20	Barnstaple	20 0 0	7 10 0	
1158	2	Barton-on-Humber.	2 0 0	& Bns. 5 0 0	2 0 0
120	25	Basingstoke	25 0 0	8 0 0	30 to 34
2500	16	*Bath*, A shares	16 0 0	8 0 0	37 15 0
2500	8	Do., B shares	8 0 0	7 0 0	united
2500	10	Do., C shares	6 0 0	7 0 0	9 10 0
		Battle £2000		6 0 0	
56	26⅔	Bawtry	26 12 6	6 0 0	25 0 0
		Beaminster			
		Beaumaris			
710	10	*Beccles Gas & Water.*	10 0 0	2 10 0	
		Bedale, Yorkshire.			
300	30	Bedford	25 0 0	4 0 0	20 0 0
350	10	Bedworth	10 0 0	7 0 0	11 10 0
300	3	Belford	3 0 0		1 10 0
350	10	Belper	10 0 0	10 0 0	14 0 0
		Berkeley			
		Berkhampstead			
1086	10	Berwick & Tweedmouth	10 0 0	7 0 0	13 10 0
		Bewdley			
200	10	Bicester	10 0 0	5 10 0	11 0 0
330	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
		Billericay			
5000	5	*Bilston*	5 0 0	8 0 0	7 12 6
200	10	Bingham	10 0 0	4 0 0	
		Bingley £7400		4 0 0	
1200	80	*Birmingham*, A shares	80 0 0	9 0 0	145 to 147
400	8	Do., B shares	8 0 0	9 0 0	14½ to 15
2500	40	Do., new shares	40 0 0	7 10 0	60½ to 61½
2400	50	*Birmingham & Staffordshire*	50 0 0	10 0 0	100 0 0
2400	25	Do., new shares	25 0 0	10 0 0	50 0 0
7020	20	Do., do.	20 0 0	10 0 0	40 0 0
12500	28	Do., do.	1 0 0	7 10 0	4 2 6
250	16	Birstall	12 0 0	12*s.* 6*d.* per sh.	12 0 0
		Bishop's Auckland.			
180	10	Bishop's Castle	10 0 0	5 0 0	10 0 0
230	10	Bishop's Stortford.	10 0 0	5 0 0	10 0 0
6000	15	*Blackburn*, A sh.	15 0 0	9 0 0	27 0 0
6000	15	Do., B shares	2 0 0	6 15 0	3 10 0
		Blandford			
		Blyth & Cowpen			
		Bodmin			
		Bognor			
100	10	Bolsover	10 0 0		10 0 0
3909	16½	*Bolton*	16 10 0	10 0 0	40 0 0
7466	16½	Do., new shares	3 10 0	6 10 0	5 5 0
800	10	*Boston*	10 0 0	8 10 0	
1200	10	Do., new shares		8 10 0	
		Boughton Blean			
193	10	Bourne	10 0 0	5 0 0	
160	10	Brackley	10 0 0	6 0 0	10 0 0
		Bradford, Wilts			
	25	*Bradford, Yorkshire*	25 0 0	10 0 0	49 0 0
		Braintree			
		Brampton, Cumberland.			
		Brandon, Suffolk			
579	10	Brecon (Limited)	10 0 0	8 0 0	14 0 0
89700	Sk.	*Brentford*	All.	4 0 0	60 to 65
1659	20	Do., preference	1 0 0	5 0 0	
		Brentwood			
		Bridge, near Canterbury.			
		Bridge-end, Glamorganshire			
200	50	*Bridgwater*	50 0 0	7 0 0	50 0 0
400	10	Bridlington	10 0 0	7 10 0	12 10 0
450	10	Bridport	10 0 0	5 0 0	10 0 0
6000	5	*Brierly Hill*	5 0 0	4 0 0	5 2 6
		Brigg			
3375	20	*Brighton*	20 0 0	7 10 0	23 to 23¾
2471	20	*Brighton & Hove*	20 0 0	6 0 0	19 to 21
107	8	Do., new shares			
181250	Sk.	*Bristol United*	Stock.	9 0 0	178 to 180
300	5	Briton-ferry	5 0 0		
150	8	Brixham	8 0 0	5 0 0	
		Broadstairs			
1000	5	Bromley, Kent	5 0 0	7 0 0	
		Bromsgrove			
100	10	Bromyard (Limited).	10 0 0		
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 to 9
		Brynmawr			
100	25	Buckingham	25 0 0	6 0 0	26 to 27
500	1	Burley-in-Wharfdale (Limited)	1 0 0	5 0 0	1 1 0
		Burnham, Somers.			
1600	5	*Burslem & Tunstall*	5 0 0	10 0 0	9 0 0
2240	5	Do., new shares	5 0 0	7 10 0	7 0 0
1200	10	*Bury St. Edmund's*	10 0 0	10 0 0	17 10 0
1800	10	Do., new shares	1 10 0	10 0 0	
503	10	Buxton (Limited)	10 0 0	7 10 0	14 0 0
150	10	Caistor	10 0 0	7 0 0	12 0 0
187	5	Callington	5 0 0		5 0 0
215	10	Calne, Wilts	10 0 0	6 0 0	10 0 0
		Camborne			
600	50	*Cambridge*	50 0 0	7 0 0	80 0 0
160	12½	Do., new shares	12 10 0	7 0 0	20 0 0
640	8½	Do., do.	4 0 0	7 0 0	6 0 0
240	50	*Canterbury Gas & Water*	50 0 0		55 to 60
240	25	Do., new shares	25 0 0	} £6	27 to 30
240	12½	Do., do.	12 10 0		13 to 15
240	6½	Do., do.	6 5 0		6½ to 7½
800	25	*Cardiff*, A shares	25 0 0	10 0 0	42 0 0
800	25	Do., B shares	25 0 0	8 0 0	38 0 0
160	25	Carmarthen	25 0 0	5 0 0	30 0 0
		Carnarvon			
		Carshalton			
200	6	Castlecary	6 0 0		5 0 0
200	10	Castle Donnington	10 0 0	6 0 0	12 14 0
249	5	Castleford	5 0 0	5 0 0	5 0 0
400	5	Castletown, Isle of Man.	5 0 0	5 0 0	5¼ to 5½
620	2	Cawood (Limited)	2 0 0	4 0 0	
		Chatteris			
300	10	Cheadle	10 0 0	5 0 0	10 0 0
200	50	Chelmsford	50 0 0	8 0 0	70 0 0
200	25	Do., new shares	25 0 0	8 0 0	35 0 0
2500	16	*Cheltenham*, A shares	16 0 0	8 0 0	
2500	8	Do., B shares	8 0 0	7 0 0	
		Do., new shares		7 0 0	
500	10	*Chepstow*, A shares.			
200	10	Do., B shares			
		Chertsey (*see* Co. & General, London)			
230	10	Chesham	10 0 0	5 0 0	10 10 0
30000	Sk.	*Chester United*	Stock.	8 0 0	
24650	,,	Do., preference	,,	7 0 0	140 0 0
535	10	Do., new shares	2 10 0	7 0 0	3 10 0
250	5	Chester-le-Street	5 0 0	6 0 0	5 0 0
19200	Sk.	*Chesterfield Gas & Water*		5 0 0	
400	50	Do., new shares	50 0 0	5 0 0	52 0 0
240	25	Chichester	25 0 0	6 0 0	31 10 0
		Chippenham			
329	10	Chipping Norton (Limited)	10 0 0	5 0 0	
100	10	Chipping Ongar	10 0 0	2 10 0	5 0 0
838	20	Chorley	20 0 0	7 0 0	27 0 0
		Chowbent, Lancashire			
		Christchurch			
200	5	Church Stretton (Limited)	5 0 0		
680	10	Cirencester	10 0 0	5 0 0	11 0 0
357	10	Cleckheaton, A shares	10 0 0	5 0 0	
357	10	Do., B shares	10 0 0	5 0 0	
350	10	Clevedon	10 0 0	4 10 0	10 0 0
1132	5	*Clitheroe*	£ s d	£ s d	£ s d
300	5	Cockermouth	5 0 0	5 0 0	5 5 0
900	20	Coggeshall	5 0 0		4¼ to 5
		Colchester	20 0 0	7 0 0	24 0 0
		Coleford, Gloucestershire.			
160	10	Collingham (Lim.)	10 0 0	5 0 0	10 0 0
		Collumpton			
150	20	Colne, Lancashire	20 0 0		36 0 0
150	10	Do., ½ shares	10 0 0	} £10	18 0 0
150	5	Do., ¼ shares	5 0 0		9 0 0
150	5	Do., A shares	5 0 0		9 0 0
150	5	Do., B shares	5 0 0		9 0 0
150	5	Do., C shares	2 0 0		5 0 0
200	25	*Congleton*	25 0 0	5 0 0	31 0 0
320	5	Conway (Limited). Corsham	5 0 0		5 0 0
1600	25	*Coventry*	25 0 0	8 0 0	35 0 0
	25	Do., new shares	25 0 0	7 10 0	
200	10	Cowbridge	10 0 0	3 0 0	5 0 0
5000	10	Cowes	10 0 0	5 0 0	
		Cradley Heath, nr. Dudley			
		Cranbrook. £1900		5 0 0	
		Crayford & Bexley.			
420		Crediton	5 0 0	5 0 0	6 0 0
225	10	Crewkerne	10 0 0	3 0 0	10 0 0
200	10	Croft & Hurworth-upon-Tees (Limited	9 0 0		
1200	1	Crook (Limited)	1 0 0	10 0 0	1 5 0
251	5	Crowland	5 0 0	7 0 0	
181	10	Crowle, Lincoln	10 0 0	10 0 0	
4000	5	*Croydon Commercial*	5 0 0	10 0 0	
250	20	Dartford	20 0 0	7 0 0	27 0 0
700	5	Dartmouth (Lim.)	5 0 0	5 0 0	5 0 0
125	20	Daventry	20 0 0	5 0 0	24 8 0
165	10	Dawley	10 0 0	5 0 0	10 0 0
346	5	Dawlish	5 0 0	8 0 0	7 10 0
800	10	Deal & Walmer	10 0 0	5 0 0	10 0 0
1200	1	Deddington	1 0 0		
		Delph, Yorkshire			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
1100	25	*Derby*	25 0 0	10 0 0	51 to 53
		Dercham			
7000	5	*Devonport*	5 0 0	8 0 0	8 12 6
3000	5	Do., new shares	2 0 0	4 0 0	2 2 6
4000	5	*Dewsbury & Batley*	5 0 0	7 10 0	7 10 0
2000	5	Do., new shares	3 0 0	7 10 0	
		Dolgelly			
160	10	Donnington	10 0 0	5 0 0	10 0 0
340	25	Dorchester	25 0 0	5 0 0	30 0 0
120	25	Dorking	24 0 0	5 0 0	25 0 0
		Dorrington, Lincolnshire.			
192	25	Douglas, I. of Man	25 0 0	8 0 0	30 0 0
21945	Sk.	*Dover*	100 0 0	6 0 0	108 0 0
400	10	Do., new shares	5 0 0	6 0 0	6 0 0
500	10	Dowlais (Limited)	10 0 0	8 0 0	12 0 0
25	60	Downham Market	60 0 0	7 10 0	
		Driffield			
		Droitwich			
500	20	*Droylsden*	10 0 0		
600	30	*Dudley*	30 0 0	6 0 0	37 to 40
1500	20	*Dukinfield*	10 0 0	10 0 0	22 10 0
200	10	Dunmow	10 0 0	5 0 0	10 0 0
		Dunstable			
900	10	Durham	10 0 0	10 0 0	} £26
900	10	Do., new shares	5 10 0	10 0 0	
250	10	Dursley, Gloucestershire.	9 0 0	6 0 0	9 5 0
150	5	Easingwold	5 0 0	5 0 0	
400	10	Eastbourne	10 0 0	5 0 0	11 0 0
90	20	East Dereham	20 0 0	5 0 0	21 0 0
356	5	East Grinstead	5 0 0	6 0 0	5 0 0
1200	5	East Retford	5 0 0	10 0 0	7 10 0
		Egremont, Cumberland.			
703	6½	*Elland*	6 10 0	8 0 0	10 0 0
800	5	Elsecar (Limited)	5 0 0	5 0 0	5 12 0
		Eltham			
200	10	Emsworth			
400	5	Enfield	5 0 0	5 0 0	5 0 0
300	19	Epsom & Ewell	19 0 0		
		Erith			
325	10	Eton—Cannel Gas (Limited)	10 0 0	5 0 0	10 0 0
700	10	Evesham (Lim.)	10 0 0	6 0 0	9½ to 10
1600	25	*Exeter*	25 0 0	8 0 0	40 to 42
250	10	Exmouth	10 0 0	5 0 0	10 0 0
58	25	Eye	25 0 0	5 0 0	25 0 0
170	10	Fairford	10 0 0	3 0 0	
100	38	Fareham	38 0 0	5 0 0	
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farnworth & Kearsley.			
		Farringdon			
		Faversham			
120	10	Fenny Stratford (Limited)	10 0 0	5 0 0	11 0 0
	5	Filey	5 0 0	5 0 0	7 0 0
300	10	Folkestone	10 0 0	10 0 0	15 0 0
240	10	Do., new shares	8 0 0	10 0 0	13 0 0
280	5	Framlingham	5 0 0	5 0 0	5 10 0
1155	1	Frodsham (Limited)	1 0 0	2 10 0	1 0 0
160	25	Frome	25 0 0	7 10 0	
160	25	Do., new shares	20 0 0	7 10 0	
12000	Sk.	*Gainsborough*	All	6 0 0	110 to 115
400	20	Do., new shares	4 0 0	6 0 0	

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
170	10	Gillingham (Lim.) Dorset	10 0 0	3 0 0	
103	25	Glastonbury	25 0 0	4 0 0	15 0 0
		Glossop . £10,000		9 0 0	
1000		*Gloucester*, A shares.	25 0 0	10 0 0	40 0 0
856	25	Do., B shares.	12 10 0	7 10 0	16 10 0
260	20	Godalming	20 0 0	5 0 0	20 0 0
300	5	Do., new shares.	5 0 0	5 0 0	5 0 0
100	20	Do., do.	8 0 0		
100	5	Do., do.	2 0 0		
621	5	Gomersal	5 0 0	6 0 0	6 7 6
		Gorleston & Southdown			
		Gosport			
450	20	Grantham	20 0 0	7 0 0	28 0 0
1000	20	Gravesend	20 0 0	5 0 0	21 0 0
		Grays Thurrock			
643	5	Great Berkhampstead	5 0 0	6 0 0	5 10 0
1000	10	*Great Grimsby*	9 10 0	9 0 0	16 0 0
1000	6¼	Do., new shares.	4 10 0	9 0 0	7 0 0
700	5	Great Harwood	5 0 0	4 5 0	
280	5	Do., new shares.	1 0 0		
210	10	Great Marlow	10 0 0	5 0 0	10 0 0
		Great Torrington			
450	5	Great Wigston	5 0 0	6 0 0	
150	1	Do., new shares.	1 0 0	6 0 0	
1300	10	Guernsey	9 0 0	8 15 0	18 0 0
352	25	*Guildford*, A shares.	25 0 0		
352	3	Do., B shares.	3 0 0		
		Do., new shares.			
		Guisborough			
240	5	Hadlow (Limited).	5 0 0		
140	10	Hailsham	10 0 0	6 0 0	10 0 0
40	50	Halesowen	50 0 0	6 0 0	
480	5	Halesworth	5 0 0	7 10 0	7 5 0
240	5	Haltwhistle (Limited)	5 0 0	4 10 0	5 0 0
		Hampton			
1000	10	*Harrogate*	10 0 0	5 0 0	11 to 11¼
6800	5	*Hartlepool Gas & Water*	5 0 0	7 0 0	7 12 6
3322	5	Do., new shares.	5 0 0	7 0 0	7 0 0
9878	5	Do., do.	1 10 0	7 0 0	
		Hartley Wintney, Hants.			
		Harwich			
662	6	*Haslingden*	6 0 0	10 0 0	10 0 0
343	6	Do., A shares.	4 0 0	10 0 0	6 0 0
1254	25	*Hastings & St. Leonards*	25 0 0	8 0 0	
180	10	Hatfield			
500	5	Havant	5 0 0	3 0 0	5 0 0
120	10	Haverhill	10 0 0	5 0 0	10 0 0
244	5	Haworth	5 0 0		5 5 0
		Hay, Brecon			
		Haydon Bridge			
4965	1	Hebden Bridge	1 0 0		
		Heckington, Lincolnshire.			
120	10	Hedon (Limited)	10 0 0	3 0 0	
145	12	Helston	12 0 0	9 0 0	
250	10	Hemel Hempstead	10 0 0	4 0 0	7 0 0
300	10	Henley (Limited)	10 0 0		
		Hereford. £10,000		4 10 0	
300	10	Herne Bay	10 0 0	6 0 0	11 0 0
		Hertford			
470	10	Hexham	10 0 0	8 0 0	14 0 0
400	25	*Heywood*	25 0 0	7 10 0	40 0 0
400	25	Do., new shares.	25 0 0	7 10 0	37 10 0
160	10	Higham Ferrers	10 0 0	7 0 0	12 0 0
		Highworth, Wiltshire.			
520	5	High Wycombe	5 0 0	6 0 0	6 16 0
300	10	Hinckley	10 0 0	7 10 0	10 0 0
600	5	Hindley, Lancashire.	3 0 0		3 0 0
200	20	Hitchin	20 0 0	8 0 0	
200	5	Do., new shares.	5 0 0	8 0 0	
		Hoddesden			
555	20	*Holmfirth*	19 0 0	5 0 0	19 0 0
960	5	Holyhead	5 0 0	6 0 0	6 2 6
		Holywell (*see* British Provincial)			
98	25	Honiton	25 0 0	3 12 0	20 0 0
1250	1	Honley (Limited)	1 0 0	5 0 0	1 0 0
6	500	Horncastle	£500		
		Hornsey (Lim.)			
1200	2½	Horsforth	2 10 0		2 10 0
142	20	Horsham	20 0 0	10 0 0	25 0 0
	10	Houghton-le-Spring	10 0 0	8 0 0	
		Howden			
1700	20	*Huddersfield*	20 0 0	10 0 0	37 5 0
250	20	Do., new shares.	15 0 0	10 0 0	
		Hull			
		Hull-Sculcoates (*see* British Provincial)			
210	10	Hungerford	10 0 0	5 0 0	10 0 0
250	10	Huntingdon & Godmanchester	10 0 0	4 0 0	10 0 0
860					
600	10	Huyton & Roby	10 0 0	6 0 0	11 0 0
2500	10	*Hyde*	9 0 0	5 10 0	10 15 0
400	10	Hythe & Sandgate (Limited)	10 0 0	6 0 0	10 15 0
		Idle & Eccleshill			
		Ilford			
198	12	Ilfracombe	2 0 0	4 0 0	8 to 9
560	6¼	Ilkestone	6 5 0	11 4 0	8 0 0
		Ilkley			
		Ilminster			
250	5	Ingatestone (Lim.)	5 0 0	1 10 0	
2800	10	*Ipswich*	10 0 0	8 0 0	15 to 16
		Ironbridge			
180	10	Irthlingborough	10 0 0	5 0 0	10 0 0
800	25	*Isle of Thanet* (Margate & Ramsgate.)	20 0 0	5 0 0	31 to 33
		Jersey, St. Helier's			
363	5	Kelvedon (Lim.)	5 0 0		
1842	9	*Kendal Union Gas & Water*	9 0 0	7 0 0	12 10 0
		Do., preference	20 0 0	7 10 0	35 0 0
380	20	Kenilworth (Limited)	10 0 0	4 0 0	10 0 0
290	10	Keswick	5 0 0	5 0 0	4 0 0
400	5	Kettering	25 0 0	6 0 0	30 0 0
200	25	Keynsham			
		Kidderminster, £10,000.		5 0 0	
		Kidsgrove			
150	10	Kimbolton	10 0 0	7 0 0	12 0 0
140	7	Kingsbridge	7 0 0		10 to 11
		King's Cliff			
		Kingston-on-Thames.			
		Kington, Hereford			
		Kirby Lonsdale			
		Kirkburton			
330	5	Kirkham, Lanc.	5 0 0	4 0 0	5 0 0
330	2½	Do., new shares.	2 10 0	4 0 0	2 10 0
200	10	Kirton-in-Lindsey (Limited)	10 0 0	5 0 0	10 10 0
200	5	Knighton	5 0 0		
1000	10	*Knottingley*			
470	31½	*Lancaster*	31 10 0	7 2 10	45 to 46
470	6 gs.	Do.	6 6 0	7 2 10	9 to 9½
564	15¾	Do.	15 15 0	5 0 0	21 to 22
50	25	Langport	25 0 0	4 0 0	15 0 0
		Launceston			
		Lea Bridge (*see* Co. & Gen.)			
1000	20	*Leamington Priors*	20 0 0	8 0 0	25 0 0
250	20	Do., new shares.	15 0 0	5 0 0	17 0 0
213	10	Leatherhead	10 0 0	5 0 0	10 0 0
		Ledbury			
		Leeds Old Company—			
60300	Sk.	Old shares	£100	10 0 0	174 to 176
50000	„	New do.	£100	6 0 0	113 to 114
3970	10	Do. do.	7 0 0	6 0 0	8¼ to 8¾
		Leeds New Company—			
45000		Old stock	£100	10 0 0	180 0 0
35000		New do.	£100	6 0 0	115 0 0
8000	6¼	Do., shares	5 15 0	6 0 0	6 17 6
3900	10	*Leicester*	10 0 0	8 0 0	16¼ to 16¾
		Leigh			
426¼	21	Leighton Buzzard	21 0 0	7 0 0	25 0 0
	10¼	Do., new shares.	10 10 0	7 0 0	12 10 0
400	10	Leominster	10 0 0	5 0 0	9 0 0
330	25	Lewes, A shares.	25 0 0	8 0 0	31 5 0
644	5	Do., B shares.	5 0 0	8 0 0	6 5 0
245	5	Leyburn, Yorkshire.	5 0 0		6 0 0
		Leyland, Lancashire.			
250	20	Lichfield	20 0 0	10 0 0	40 0 0
320	25	*Lincoln*	25 0 0	10 0 0 & Bns. of 12/6	70 0 0
300	5	Lindfield (Limited)	5 0 0		5 0 0
240	5	Liskeard	5 0 0	8 0 0	6 0 0
240	5	Littlehampton	5 0 0	7 10 0	5 0 0
	100	*Liverpool United*	£100	10 0 0	205 0 0
	25	Do., ¼ share	25 0 0	10 0 0	50 0 0
		Llandovery (Lim.)			
		Llandudno Gas & Water			
		Llanelly . . £3000		5 0 0	
		Llangollen			
250	10	Llanrwst (Limited)	9 15 0	5 0 0	9 15 0
		LONDON COMPANIES.			
5000	10	Anglo-Romano (*en commandite*)	10 0 0	8 0 0	10 to 12
5000	20	British Provincial	20 0 0	7 0 0	26 to 27
	20	Do., new	16 0 0	7 0 0	18 to 19
		(Norwich, Hull-Sculcoates, Shelton Potteries, Trowbridge, & Holywell.)			
12000	50	*Chartered*	50 0 0	9 0 0	70 to 72
6000	50	Do.	15 0 0	9 0 0	25¼ to 26¼
10000	20	*City of London*, A shares	20 0 0	7 0 0	25 to 27
10000	10	Do., B shares	10 0 0	4 0 0	7 to 7¼
10000	10	Do., new shares.	5 0 0	7 0 0	7¼ to 8
10000	25	*Commercial*	25 0 0	10 0 0	36 to 38
6000	25	Do., new shares.	7 10 0	10 0 0	11 to 12
1891	5	County & General (Limited)	5 0 0	6 0 0	
2000	5	Do., preference (Pater, Pembroke, Chertsey, Lea Bridge, Northfleet, Walton, & Ware.)	5 0 0	6 0 0	
5000	10	*Crystal Palace District*	10 0 0	6 0 0 & Bns.	12¼ to 13
4000	50	*Equitable*	50 0 0	10 0 0	
4000	10	Do., new shares.	5 0 0	10 0 0	11 to 13
23406	10	European (Lim.) (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	10 0 0	10 0 0	12¼ to 12¾
17216	10	*Great Central Gas Consumers*	10 0 0	6 0 0	12¼ to 13
13000	50	*Imperial*, old shares.	50 0 0	10 0 0	80 to 82
13000	50	Do., new shares.	35 0 0	10 0 0	57 to 59
1300	100	Do., bonds	£100	10 0 0	200 to 205
28000	50	*Imperial Continental*	43 5 0	7 0 0	48 to 50
		(Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Toulouse, & Vienna.)			
3000	40	*Independent*	40 0 0	5 0 0 & Bns.	58 to 62
4904	50	*London*	50 0 0	6 0 0	66 to 68
5519	25	Do., 1st pref.	25 0 0	6 0 0	29 to 30
1921	50	Do., 2nd pref.	50 0 0	6 0 0	62 to 64
870	50	Do., 3rd pref.	50 0 0	6 0 0 & Bns.	62 to 64
20455		Do., 1st pref. sk		6 0 0	
13608		Do., 2nd pref. sk		6 0 0	
50000	1	Oriental (Limited), Calcutta	1 0 0	4 10 0	1 to 1¼
50000	1	Do., new shares.	0 15 0	4 10 0	¾ to 1
9000	60	*Phœnix*	53 0 0	9 0 0	70 to 72
5000	20	*Ratcliff*	16 0 0	5 0 0 & Bns.	16 to 17
4000	50	*South Metropolitan*	38 0 0	10 0 0	55 to 60
12633	10	*Surrey Consumers*	10 0 0	8 0 0	13¼ to 14
2147	10	Do., new shares.	2 0 0	8 0 0	2 5 0
9000	50	United General (Dublin & Limerick)	50 0 0	2 10 0	24 to 25
10000	10	*Victoria Docks*			
1500	10	*Wandsworth & Putney*	10 0 0		
1500	10	Do., new shares.			
20000	10	Western (Limited) A shares.	10 0 0	9 0 0	16 to 17
10000	10	Do., B shares.	2 0 0	9 0 0	4¾ to 5¼
2777	5	*West Ham*	5 0 0		
13223	5	Do., new shares.			
		Long Buckby (Limited).			
120	10	Long Sutton (Limited).	10 0 0	7 10 0	11 to 12
		Longton (Lim.)			
		Longwood, near Huddersfield.			
250	5	Lostwithiel	5 0 0		6 0 0
250	1	Do., new shares.	1 0 0		1 0 0
711	6	Loughborough	6 0 0	8 0 0	9 0 0
711	6	Do., new shares.	4 0 0	8 0 0	6 0 0
240	25	*Louth*	25 0 0	10 0 0	
2500	10	*Lowestoft Gas & Water*			
611	5	Ludlow Union	5 0 0	5 0 0	5 to 5¼
110	5	Do., pref. shares	5 0 0	5 0 0	
640	10	*Luton*	10 0 0	7 10 0 & Bns.	12 0 0
640	5	Do., preferential	5 0 0	4 0 0	5 0 0
640	5	Do., new shares.	5 0 0	7 10 0 & Bns.	6 0 0
100	20	Lutterworth	20 0 0	6 5 0	25 0 0
63	20	Lyme Regis	20 0 0	4 0 0	20 0 0
120	25	Lymington	25 0 0	5 0 0	25 0 0
300	10	Maidenhead	10 0 0	5 0 0	10 0 0
500	25	*Maidstone*, A sh.	25 0 0	10 0 0	45 0 0
500	25	Do., B shares.	25 0 0	4 0 0	20 0 0
	25	Do., new shares.	25 0 0	7 10 0	
204	23	Maldon	23 0 0	7 0 0	27 0 0
200	10	Malmesbury	10 0 0	2 10 0	5 15 0
		Manningtree			
		Mansfield . £5000		10 0 0	
150	10	Mansfield Woodhouse	10 0 0		
		March			
		Margate (*see* Isle of Thanet)			
		Market Drayton			
132	25	Market Harboro'	25 0 0	7 0 0	35 0 0
		Market Weighton.			
		Markyate Street (Limited).			
		Marlborough			
150	10	Marsden (Lim.)	10 0 0	5 0 0	10 0 0
370	10	Maryport	10 0 0	6 0 0	12 0 0
500	5	Matlock Baths	5 0 0		
200	2	Measham (Lim.)	1 12 6	5 0 0	
220	10	Melbourne	10 0 0	6 0 0	12 0 0
		Melksham			
934	2	Meltham	2 0 0	4 10 0	
		Melton Mowbray			
50	10	Mere	10 0 0		
		Merthyr Tydvil			
120	10	Middleham	10 0 0	5 0 0	10 0 0
3000	10	*Middleton*		10 0 0	
		Midhurst (Lim.)			
		Midsummer Norton.			
198	5	Mildenhall	5 0 0	5 0 0	
		Milverton (Lim.)			
2000	5	*Mirfield*	5 0 0	5 0 0	6 5 0
700	10	Mitcham	10 0 0	10 0 0	14 10 0
650	5	Mold Gas & Water	5 0 0	7 10 0	6¼ to 6½
700	10	Monmouth Gas & Water	10 0 0	5 0 0	10 0 0
250	5	Montgomery (Limited).	5 0 0		
150	10	Moreton-in-Marsh	9 2 6	4 0 0	9 2 6
1000	5	Morley, near Leeds.	5 0 0	6 0 0	6 15 0
220	16	Morpeth	16 0 0	5 0 0	17 10 0
		Mossley			
		Mottram			
		Nantwich			
		Nayland			
		Neath			
185	10	Needham Market	10 0 0	4 0 0	
		Newark . . £5000		10 0 0	
		Newburn			

No. of Shares issued.	Amount per share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
250	20	Newbury	20 0 0	5 0 0	20 0 0
16000	8	Newcastle & Gateshead Union	8 0 0	7 0 0	10 10 0
		Newcastle-under-Lyne £6200		4 0 0	
250	5	Newent	5 0 0		
		Newhaven, Sussex			
		New Malton			
600	5	Newmarket	5 0 0	4 0 0	4 0 0
366	2	Do., preference	2 0 0	6 0 0	2 0 0
200	20	*New Mills & Hayfield*	15 10 0	5 0 0	
70	20	Newnham (Lim.)	20 0 0		21 0 0
		Newport Pagnell			
360	35	*Newport, Monmouth*, A sh.	35 0 0	9 0 0	50 0 0
540	35	Do., B shares	35 0 0	7 10 0	42 10 0
		Newport, Salop			
250	5	New Romney (Ld.)	5 0 0	5 0 0	5 0 0
		Newton Abbott			
198	10	Newtown, Montgomeryshire	10 0 0	6 0 0	10 0 0
		Northallerton			
777	20	*Northampton*, A shares	20 0 0	10 0 0	
777	20	Do., B shares	20 0 0	4 0 0	
777	20	Do., C shares	10 0 0	7 10 0	
		Northfleet (*see* Co. & General)			
2914	5	N. Shields, Tynemouth	5 0 0	5 0 0	6 to 6¼
120	10½	North Walsham	10 10 0	5 0 0	10 15 0
371	15	Northwich	15 0 0	5 0 0	15 0 0
		Norwich (*see* Brit. Provincial)			
4000	50	*Nottingham*	50 0 0	5 0 0	
	50	Do., new shares	50 0 0	10 0 0	
268	8	Nuneaton (Lim.)	8 0 0	5 0 0	7 10 0
125	8	Do., new shares	8 0 0	5 0 0	7 10 0
		Oaken Gates, Salop			
240	5	Oakhampton (Limited)	5 0 0		
200	10	Odiham	10 0 0	5 0 0	10 0 0
		Olney			
360	10	*Ormskirk*, old sh.	10 0 0	8 0 0	14 0 0
1080	10	Do., new shares	4 10 0	8 0 0	6 4 6
2400	5	*Ossett & Horbury*	5 0 0	5 0 0	5 10 0
		Oswestry			
		Otley, Yorkshire			
80	25	Oundle	25 0 0	7 0 0	25 0 0
600	15	*Over Darwen*, original	15 0 0	7 10 0	22 10 0
600	15	Do., A shares	15 0 0	7 10 0	22 10 0
1200	15	Do., B shares	5 0 0	6 0 0	12 15 0
1694	1	Over & Wharton (Limited)	1 0 0		1 2 0
120	150	*Oxford*	£150	9 10 0	250 0 0
		Padiham			
		Paington (Lim.)			
		Painswick			
		Pately Bridge, Yorkshire			
300	5	Peel, Isle of Man	5 0 0	7 0 0	6 to 7
		Pembroke (*see* Co. & General)			
500	20	*Peniston, Thurlstone, & Ozspring*			
250	20	Penrith	15 0 0	6 10 0	21 0 0
153	20	Penzance	20 0 0		15 0 0
320	5	Petersfield	5 0 0	5 0 0	
200	10	Petworth	10 0 0	9 17 6	15 0 0
		Pickering			
2500	10	*Plymouth & Stonehouse*	10 0 0	10 0 0	20 0 0
2500	10	Do., new shares	10 0 0	7 10 0	15 0 0
160	10	Pocklington	10 0 0		5 0 0
		Ponder's End & Enfield Highway (Limited)			
		Pontefract			
		Pontypridd		4 0 0	
400	10	Poole	10 0 0	10 0 0	15 0 0
344	2	Do., new shares	2 0 0	10 0 0	3 0 0
		Port Madoc			
600	53	*Portsea Island*	53 0 0	6 0 0	66 to 69
600	50	Do., new shares	50 0 0	6 0 0	62 to 65
120	10	Potton, Bedfordsh.	10 0 0	5 0 0	10 0 0
400	10	Prescott	10 0 0	5 0 0	
		Presteign			
60000	Sk.	*Preston*	All.	10 0 0	260 0 0
3000	20	Do., new shares	11 0 0	10 0 0	23 0 0
1000	10	Provincial (Hull)	8 0 0		8 0 0
600	20	*Pudsey*	20 0 0	7 10 0	30 0 0
600	6⅔	Do., new shares	4 13 4	7 10 0	4 13 4
93	20	Pwlheli	20 0 0	2 10 0	25 0 0
600	5	Quorndon & Mountsorrel	5 0	7 0 0	12 0 0
900	10	*Radcliff & Pilkington*, No. 1	10 0 0		
2100	10	Do., No. 2	6 0 0		
200	20	Ramsay, I. of Man	20 0 0	6 10 0	23 0 0
		Ramsgate (*see* Isle of Thanet)			
		Rawmarsh			
1019	10	*Reading*	10 0 0	6 0 0	10 10 0
500	20	*Reading Union*	20 0 0	7 10 0	23 0 0
400	5	Redcar	5 0 0		
		Redruth			
		Reigate			
1200	1	Repton (Limited)	1 0 0	5 0 0	1 1 0
2000	10	Richmond, Surrey (Limited)	10 0 0	7 0 0	15 0 0
400	5	Rickmansworth	5 0 0		5 0 0
180	10	Ringwood	10 0 0	5 0 0	10 0 0
180	33½	Ripon	33 10 0	4 10 0	
		Rochester & Chatham £20,000		6 0 0	
		Rochford			
		Romford			
200	25	Romsey			
		Rotherham, A shares	25 0 0	8 0 0	36 0 0
200	12½	Do., B shares	12 10 0	8 0 0	18 0 0
600	12½	Do., C shares	8 0 0	8 0 0	11 0 0
600	20⅚	Do., D shares	2 10 0	8 0 0	3 10 0
		Rothwell			
350	10	Royston	10 0 0	5 0 0	9 10 0
150	20	Rugby	20 0 0	10 0 0	
150	5	Do., ¼ shares	5 0 0	10 0 0	
150	6¾	Do., ¼ shares	6 13 4	10 0 0	
150	10	Do., new shares	10 0 0	10 0 0	
150	2½	Do., do.	2 10 0	10 0 0	
150	3¾	Do., do.	3 6 8	10 0 0	
430	10	Rugely	10 0 0	5 0 0	10 10 0
		Rumcorn £11,000		7 10 0	
114	31½	Ruthin	31 5 0	6 16 0	40 0 0
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Saddleworth			
225	22	Saffron Walden	22 0 0	4 0	16 to 18
1400	5	St. Alban's Gas & Water (Limited)	5 0 0	5 0 0	5 5 0
320	5	St. Asaph (Lim.)	5 0 0		
		St. Austel			
		St. Colomb			
3000	10	*St. Helen's*	10 0 0	10 0 0	19 0 0
		St. Ives, Cornwall			
180	10	St. Neot's	10 0 0	8 0 0	12 0 0
400	25	Salisbury	25 0 0	6 0 0	28 0 0
341	10	Sandbach	10 0 0	5 0 0	12 10 0
381	10	Sandwich	10 0 0	5 0 0	9 10 0
100	10	Saxmundham	10 0 0	5 0 0	
2000	10	*Scarborough*	10 0 0	7 0 0	13 0 0
1000	10	Do.	6 0 0	7 0 0	12 2 6
240	5	Sedburgh	5 0 0		
300	16	Selby	16 0 0	5 0 0	
140	5	Settle (Limited)	3 10 0	5 0 0	
290	10	Sevenoaks	10 0 0	4 0 0	10 0 0
300	10	Shaftesbury (Lim.)	10 0 0	5 0 0	8½ to 9
565	5	Sheepshed (Lim.)	5 0 0	6 0 0	6 0 0
		Sheerness			
135000	Sk.	*Sheffield United*, A shares	All.	10 0 0	192 0 0
39264	Sk.	Do., B shares	All.	8 0 0	162 0 0
4800	16g.	Do., D shares	9 0 0	8 0 0	8 7 6
1600	6 gs.	Do., E shares	3 7 6	8 0 0	3 2 6
600	5	Shefford (Limited)	4 0 0		
		Shelton, Potteries (*see* British Provincial)			
350	10	Shepton Mallet	10 0 0	7 10 0	10 0 0
800	5	Sherborne	5 0 0	7 10 0	5 0 0
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	7 10 0
150	10	Shipston-on-Stour	10 0 0	4 0 0	
		Shirley & Freemantle			
240	25	Shotley Bridge (Limited)	25 0 0	7 0 0	30 0 0
240	10	Do., new shares	10 0 0	7 0 0	12 0 0
1000	10	*Shrewsbury*, A shares	10 0 0		
1000	10	Do., B shares	10 0 0		
530	10	Do., new shares	10 0 0		
400	15	Skipton	15 0 0	5 0 0	18 0 0
400	2½	Do., new shares	2 10 0	5 0 0	3 0 0
250	20	Sleaford	20 0 0	5 0 0	20 0 0
250	10	Slough	10 0 0		
340	5	Snaith	5 0 0		4 0 0
		Soham			
150	10	Somerton	10 0 0		
354	5	Southam	5 0 0		
1000	50	*Southampton*	50 0 0	8 0 0	
		Southborough			
		Southend, Essex			
220	10	South Molton	10 0 0	5 10 0	7 10 0
2000	10	*South Shields*	10 0 0	7 0 0	10 11 6
248	10	Southwell (Lim.)	10 0 0	5 0 0	11 to 11¼
300	5	Southwold	5 0 0	5 0 0	5 0 0
1470	1	Spennymoor (Limited)	1 0 0		
400	5	Spilsby	5 0 0		
		Spittal, Berwick-on-Tweed			
2000	6⅔	*Stafford*	6 13 4	6 10 0	9 0 0
2000	6⅔	Do., new shares	4 0 0	6 10 0	5 0 0
178	5	Staindrop	5 0 0	6 0 0	5 0 0
248	25	Staines & Egham	25 0 0	6 0 0	26 to 27
		Staley Bridge, £15,000		10 0 0	
225	50	*Stamford & St. Martin's*	50 0 0	8 0 0	45 to 50
150	10	Staveley (Limited)	10 0 0	5 0 0	11 10 0
300	5	Stevenage	5 0 0	5 0 0	5 0 0
2000	10	*Stoke Fenton & Longton*	10 0 0	7 0 0	12 0 0
500	10	Do., new shares	2 0 0	7 0 0	
400	5	Stone, Stafford	5 0 0	5 0 0	6 0 0
220	10	Stoney Stratford	10 0 0	4 10 0	9 0 0
		Stourbridge, £5000			
		Stow-on-the-Wold			
150	20	*Stratford-on-Avon*	20 0 0	8 0 0	34 0 0
150	5	Do., new shares	5 0 0	8 0 0	8 10 0
750	5	Stretford	5 0 0	6 0 0	5 0 0
		Stroud			
261	20	Sudbury	20 0 0	5 0 0	20 0 0
18120	5	*Sunderland*	5 0 0	7 10 0	
1000	5	Do., new shares	5 0 0	7 10 0	7¼ to 7⅞
200	10	Sutton Coldfield, (Limited)	10 0 0		10 0 0
350	10	Sutton-in-Ashfield	10 0 0	7 10 0	12 10 0
		Sutton Southcoates & Drypool, Hull	20 0 0		23 to 24
		Sutton, Surrey			
169	10	Swaffham	10 0 0	5 0 0	7 0 0
120	50	*Swansea*	50 0 0		90 to 92
		Do., new shares			
		Swindon			
200	10	Swineshead (Lim.)	10 0 0	5 0 0	10 5 0
180	10	Syston	10 0 0		10 0 0
276	5	Tadcaster	5 0 0	5 0 0	3 0 0
		Tamworth			
		Tattershall & Coningsby (Lim.)			
2800	5	*Taunton*	5 0 0	6 0 0	6 0 0
2800	1¼	Do., new shares	1 10 0	6 0 0	
		Tavistock			
200	5	Tenbury Union	5 0 0	5 0 0	5½ to 6
150	10	Tenterden	10 0 0	4 0 0	8 0 0
200	10	Tetbury, Gloster	9 0 0	5 0 0	
		Tewkesbury			
200	10	Thame	10 0 0	5 0 0	10 0 0
250	10	Thetford	10 0 0	6 0 0	10 to 11
150	10	Thornbury (Lim.)	10 0 0	4 0 0	
80	1	Do., new shares	1 0 0	4 0 0	
356	5	Thorne	5 0 0		4 0 0
160	10	Thrapston (Lim.)	10 0 0	5 0 0	10 0 0
1885	5	Todmorden (Lim.)	5 0 0	7 10 0	9 0 0
600	2½	Topsham (Lim.)	2 10 0	5 0 0	
		Torpoint (Lim.)			
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes Consumers			
5000	5	*Tottenham & Edmonton*	5 0 0	8 0 0	6 0 0
150	10	Towcester	10 0 0	5 0 0	10 0 0
		Town-Malling			
275	10	Tring	10 0 0	5 0 0	10 0 0
		Trowbridge (*see* Brit. Prov.)			
320	25	Truro	25 0 0	8 0 0	
		Tunbridge			
		Tunbridge Wells			
100	10	Tuxford	10 0 0	5 0 0	12 0 0
600	5	Tyldesley (Lim.)	5 0 0	7 10 0	7 0 0
		Ulverston			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
310	5	Usk (Limited)	5 0 0	7 0 0 & Bns.	6 12 6
230	10	Uttoxeter	10 0 0	5 0 0	11 to 12¼
		Uxbridge			
		Ventnor			
160	10	Wainfleet (Lim.)	10 0 0		8 0 0
1000	25	*Wakefield*	25 0 0	10 0 0	44 0 0
3660	3	Do.,	5 0 0	10 0 0	8 16 0
1732	5	Do., new shares	5 0 0	7 10 0	6 15 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Walton-on-Tham. (*see* Co. & Gen.)			
200	10	Wantage	9 0 0	5 0 0	10 10 0
		Ware (*see* County & General)			
100	10	Wareham	10 0 0	3 10 0	8 0 0
2000	1	Warkworth and Amble	1 0 0	3 10 0	
160	25	Warminster	25 0 0	6 0 0	28 0 0
900	20	*Warrington*	20 0 0	10 0 0	39 0 0
900	20	Do., new shares	13 0 0	10 0 0	24 0 0
		Warth			
		Warwick. £15,000		6 0 0	
		Watford			
400	10	Weedon (Limited)	10 0 0	8 10 0	15 0 0
400	3	Do., new shares	1 10 0	8 10 0	2 5 0
111	25	Welchpool, Montg.	25 0 0	5 0 0	25 0 0
		Wellingborough			
450	10	Wellington, Salop.	10 0 0	7 10 0	12 10 0
		Wellington, Som.			
160	25	*Wells*, Somerset	25 0 0	10 0 0	
160	10	Westbury	10 0 0		
		West Cowes			
225	10	Westerham (Lim.)	10 0 0	5 0 0	11 0 0
454	5	West Malling Gas & Water	5 0 0	3 0 0	4 10 0
400	20	*Weston-sup-Mare*	20 0 0	6 10 0	
200	5	Wetherby	5 0 0		1 10 0
2000	10	*Weymouth*			
2300	1	Whitchurch, Hants (Limited)	0 10 0	2 10 0	
400	25	Whitehaven	25 0 0	2 0 0	14¼ to 15
		Whitehaven New			
		Whitstable			
250	10	Whittlesea	10 0 0	5 0 0	11 0 0
300	10	Whitwick & Coalvle	10 0 0		10 0 0
1200	5	*Whitworth Vale*	5 0 0	6 0 0	6 14 0
1200	5	Do., new shares	3 15 0	6 0 0	4 17 0
		Widnes Gas & Water			
1250	10	*Wigan*	10 0 0	10 0 0	22 0 0
400	5	Wigston	5 0 0	6 0 0	5 0 0
		Wigton, Cumberland			
1020	5	*Willenhall*, A shares	5 0 0		
1020	5 4s.	Do., B shares	2 14 0	5 0 0	
		Do., new shares			
		Wilton			
600	10	Wimbledon	8 0 0		8 0 0
240	10	Wimborne Minster	10 0 0		
130	10	Wincanton	10 0 0	7 0 0	
380	50	Winchester	50 0 0	5 0 0	50 0 0
1100	20	Windsor (Limited)	20 0 0	6 5 0	23 0 0
141	10	Winslow	10 0 0	6 0 0	10 0 0
120	10	Winterton (Lim.)	10 0 0	5 0 0	
120	5	Do., new shares	5 0 0	5 0 0	
200	10	Wirksworth	10 0 0	5 0 0	10 0 0
		Wisbeach			
		Witham			
		Witney			
400	5	Wivelscombe (Limited)	5 0 0	6 0 0	5 5 0
200	10	Woburn	10 0 0	5 0 0	11 0 0
210	10	Wokingham	10 0 0	5 0 0	
4448	10	*Wolverhampton*	10 0 0	10 0 0	19 10 0
4448	10	Do., new shares	6 0 0	10 0 0	13 10 0

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
556	10	Woodbridge (Lim.)	10 0 0	5 0 0	
660	2½	Woodstock	2 10 0	5 0 0	
		Woohouses			
200	7	Wooler	7 0 0		
		Woolwich Consrs.			
		Woolwh. Equitable			
2405	10	*Worcester*	10 0 0	7 0 0	14 7 6
600	10	*Worksop*	10 0 0	5 0 0	
600	5	Do., new shares	5 0 0	5 0 0	
		Worthing			
270	12	Wotton-un.-Edge	12 0 0	4 0 0	7 0 0
600	5	Wrexham, A sh.	5 0 0	7 10 0	5 0 0
600	5	Do., B shares	5 0 0	5 0 0	5 0 0
600	5	Do., C shares	3 10 0	5 0 0	3 10 0
		Wye, Kent			
		Wylam			
400	5	Wymondham	5 0 0	6 10 0	5 0 0
795	20	Yarmouth	20 0 0	5 0 0	18 to 20
1675	4	Yeadon & Guiseley, near Leeds	4 0 0	7 10 0	4 10 0
1675	2	Do., new shares	0 5 0		
140	30	Yeovil	30 0 0	6 0 0	30 0 0
140	10	Do., new shares	10 0 0	6 0 0	10 0 0
12000	5	*York United*	5 0 0	10 0 0	10 2 6
3000	5	Do., new shares	2 0 0	10 0 0	5 5 0
		SCOTLAND.			
26000	2½	Aberdeen	2 10 0	10 0 0	5 1 0
		Abernethy			
500	10	Airdrie	10 0 0	9 0 0	14 10 0
		Alloa			
		Alyth			
600	5	Annan	5 0 0	5 0 0	5 0 0
1600	1	Anstruther & Cellardyke	1 0 0	8 0 0	1 6 0
825	20	Arbroath	20 0 0	7 10 0	30 0 0
100	20	Ardrossan	20 0 0	5 0 0	20 0 0
658	1	Auchinleck	1 0 0		
381	5	Auchterarder	5 0 0	7 10 0	7 10 0
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
2932	5	Ayr	5 0 0	5 0 0	5 12 0
3000	2	Ayr & Newton Cons.	2 0 0	6 0 0	2 0 0
300	10	Banff	10 0 0	6 0 0	11 0 0
2158	1	Barrhead	1 0 0	7 10 0	1 0 0
200	5	Bathgate	5 0 0	5 0 0	5 0 0
		Beith			
976	1	Bervie	1 0 0	5 0 0	
		Biggar			
739	5	Blairgowrie	5 0 0	8 0 0	7 0 0
		Borrowstowness			
540	5	Brechin	5 0 0	10 0 0	10 10 0
		Bridge of Allan			
2272	2	Broughty Ferry	2 0 0	7 10 0	2 7 6
		Campbelton			
250	4	Carluke, Lanark	4 0 0	7 10 0	4 0 0
178	5	Castle Douglas	5 0 0	5 0 0	5 0 0
		Clackmannan			
1666	3	Coatbridge	3 0 0	10 0 0	4 5 0
200	5	Coldstream	5 0 0	6 0 0	5 0 0
		Collinsburgh			
1000	1	Comrie	1 14 8	4 10 0	1 14 8
1200	1	Crail, Fife	1 0 0	5 0 0	1 0 0
2744	1	Crieff	1 0 0	10 0 0	1 15 0
600	1	Cullen	1 0 0	5 0 0	0 15 0
280	2½	Cumbernauld	2 10 0	5 0 0	2 10 0
200	5	Cumnock	5 0 0	6 0 0	6 0 0
600	5	Cupar Angus	5 0 0	7 0 0	6 10 0
250	10	Cupar Fife	10 0 0	10 0 0	18 10 0
300	10	Dalkeith	10 0 0	7 10 0	20 10 0
		Deanston			
750	2	Denny	2 0 0	6 5 0	2 5 0
	5	Dornoch			
500	1	Douglas	1 0 0	6 0 0	1 2 0
		Dufftown			
		Dumbarton			
400	20	Dumfries	14 0 0	7 2 10	14 10 0
391	5	Dunbar	5 0 0	6 0 0	5 10 0
		Dunblane			
1250	23⅓	*Dundee*	23 15 0	8 15 9	54 0 0
8000	5	*Dundee, New*	5 0 0	5 0 0	5 15 0
860	10	Dunfermline	10 0 0	7 10 0	16 10 0
		Dunkeld			
1750	2	Dunoon	2 0 0	6 0 0	2 3 0
		Dunse			
250	5	Dysart	5 0 0	7 10 0	6 10 0
2327	1	East Wemyss	1 0 0	6 0 0	1 2 0
750	1	Ecclefechan	1 0 0		
6000	25	*Edinburgh*	25 0 0	10 0 0	52 0 0
6400	25	*Edinburgh & Leith*	25 0 0	10 0 0	53 0 0
621	12	Elgin	12 0 0	6 0 0	13 0 0
1300	1	Elie & Earlsferry	1 0 0	7 5 0	1 3 0
		Ellon			
		Errol			
		Eyemouth			
	14	Falkirk	14 0 0	7 0 0	14 0 0
		Falkirk, New			
632	2	Falkland	2 0 0	5 0 0	2 0 0
2000	1	Ferry Port on Craig	1 0 0	6 5 0	1 3 0
581	1	Fochabers	1 0 0	5 0 0	1 2 0
1440	5	Forfar	5 0 0	7 10 0	7 12 6
360	5	Do., new shares	2 10 0	7 10 0	6 10 0
		Fort William			
2000	1	Fraserburgh	0 16 0	5 0 0	0 18 0
500	5	Galashiels	5 0 0	10 0 0	9 10 0
		Gatehouse, n. Fleet			
900	2½	Girvan	2 10 0	6 0 0	2 10 0
5200	25	*Glasgow*	25 0 0	10 0 0	44 10 0
3200	6¼	Do., new shares	6 5 0	10 0 0	12 1 3
15000	10	*Glasg. City & Sub.*	10 0 0	10 0 0	16 10 0
		Grahamston			
190	10	Grangemouth	10 0 0	5 0 0	10 0 0
400	8¾	Haddington	8 5 0	7 10 0	11 10 0
		Hamilton			
	5	*Hamilton, New*	5 0 0	4 10 0	6 0 0
440	5	Hawick	5 0 0	7 10 0	7 10 0
300	5	Helensburgh	5 0 0	7 10 0	7 10 0
1312	1	Huntly	1 0 0	7 10 0	1 5 0
250	5	Inverary	5 0 0	10 0 0	6 12 6
425	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness G. & Wr.*	10 0 0	7 0 0	14 0 0
2400	5	Do., new shares	1 5 0	7 0 0	2 0 0
	10	Irvine	10 0 0	10 0 0	14 0 0
	2½	Do.	2 10 0	10 0 0	3 12 6
300	5	Jedburgh	5 0 0	7 10 0	7 10 0
		Johnstone, Paisley			
1300	1	Keith	1 0 0	5 0 0	0 11 0
600	5	Kelso	5 0 0	10 0 0	11 0 0
620	2	Kelsyth	2 0 0	5 0 0	2 0 0
950	1	Kennoway	1 0 0	5 0 0	1 1 0
600	25	Kilmarnock	25 0 0	7 10 0	30 0 0
600	25	Do., new shares	7 10 0	7 10 0	
334	5	Kincardine	5 0 0	5 0 0	4 10 0
		Kinghorn			
		Kingskettle, Fife			
		Kinross			
1200	5	Kirkcaldy	5 0 0	10 0 0	10 10 0
320	5	Kircudbright	5 0 0	5 0 0	5 0 0
997	3	Kirkintulloch, nr. Glasgow	3 0 0	6 13 4	3 7 0
		Kirkwall			
		Kirriemuir			
		Lanark			
3500	1	Lanark Consumers (Limited)	1 0 0		1 2 6
		Largo, near Leven			
280	8	Largs	8 0 0	7 10 0	8 10 0
1309	1	Lasswade, near Edinburgh	1 0 0		
177	5	Lauder	5 0 0	5 0 0	5 0 0
2000	1	Leslie, Fife	1 0 0	7 10 0	1 5 0
618	1	Lesmahago	1 0 0	6 0 0	1 0 0
		Leuchars			
1800	1	Leven	1 0 0	7 10 0	23s. to 25s.
100	10	Linlithgow	10 0 0	10 0 0	19 0 0
		Linton			
		Lochee, n. Dundee			
434	5	Lochgilphead (Ld.)	5 0 0	7 0 0	5 10 0
380	5	Lochwinnock, nr. Paisley	5 0 0	3 10 0	4 0 0
1200	1	Markinch, Paisley	1 0 0	8 0 0	1 5 0
		Maryhill, n. Glasg.			
282	3	Mauchline	3 0 0	5 0 0	3 0 0
		Maxwell Town, n. Dumfries			
423	5	Maybole, Ayrshire	5 0 0	4 10 0	5 0 0
373	2	Melrose	2 0 0	7 10 0	2 10 0
718	2	Mid & East Calder	2 0 0		2 0 0
200	5	Moffat	5 0 0	5 0 0	
120	2½	Do., new shares	2 10 0	5 0 0	
400	20	Montrose	20 0 0	10 0 0	35 0 0
800	5	Musselburgh	5 0 0	8 0 0	8 8 0
618	1	Nairn	1 0 0	5 0 0	1 0 0
		Neilston, n. Glasg.			
300	5	Newburgh, Fife	5 0 0	8 0 0	7 0 0
300	1	Do., new shares	1 0 0	8 0 0	
1200	1	Newmilns, near Kilmarnock	1 0 0	7 10 0	1 2 0
		Newton-on-Ayre			
107	14½	Newton Stewart	14 10 0	5 0 0	14 10 0
300	5	N. Berwick, N.B.	5 0 0	5 0 0	7 10 0
		N. Queensferry			
245	5	Oban	5 0 0	7 10 0	5 7 6
1000	5	Peebles	5 0 0	6 0 0	5 0 0
500	2½	Do., new shares	2 10 0	6 0 0	2 10 0
1000	25	Perth	25 0 0	8 0 0	32 0 0
3000	5	Perth, New	5 0 0	6 0 0	5 12 6
		Peterhead			
2000	1	Pettenween	1 0 0	6 0 0	1 1 0
2416	1	Pollokshaws, near Glasgow	1 0 0	7 10 0	1 5 0
		Port Glasgow			
		Portobello, near Edinburgh			
200	5	Prestonpans	5 0 0	6 0 0	
1500	1½	Rutherglen	1 6 8	5 0 0	1 6 8
250	12	St. Andrew's	12 0 0	8 6 8	16 10 0
193	12	Do., new shares	12 0 0	8 6 8	16 10 0
400	5	Saltcoats	5 0 0	7 10 0	6 0 0
936	1	Sanquhar	1 0 0	5 0 0	0 15 0
30	1	Do., preference	1 0 0	5 0 0	
400	5	Selkirk	5 0 0	7 10 0	7 10 0
		South Queensferry			
200	5	Stewarton	5 0 0	10 0 0	6 to 6½
7450	2	Stirling	2 0 0	8 0 0	3 10 6
2500	1	Stonehaven	1 0 0	6 5 0	1 5 0
1110	1	Stonehouse, Lanarkshire	1 0 0	7 10 0	13s. to 15s.
600	2½	Stornoway	2 10 0	8 0 0	3 10 0
500	5	Stranraer	5 0 0	7 10 0	6 0 0
588	2	Strathaven	2 0 0	8 0 0	3 0 0
643	2½	Thurso	2 10 0		2 10 0
		Tillicoultry, near Alloa			
800	1	Tranent	1 0 0	5 0 0	1 0 0
		Troon			
		Tullibody			
2051	1	Wemyss & Buckhaven	1 0 0	6 0 0	1 0 0
		Wick			
665	5	Wigtown	5 0 0		
		IRELAND.			
1800	1	Antrim (Limited)	1 0 0		1 0 0
		Ardee			
300	10	Armagh	10 0 0	10 0 0	20 2 6
500	5	Athy (Limited)	4 0 0	6 0 0	5 0 0
		Ballycastle			
600	5	Ballymena	5 0 0	15 0 0	5 10 0
184	10	Ballymoney	10 0 0	5 0 0	10 0 0
220	5	Ballynahinch (Ld.)	5 0 0	5 0 0	5 0 0
		Bangor, Down			
700	80	*Belfast*	80 0 0	10 0 0	100 0 0
	20	Do., new shares	20 0 0	10 0 0	25 0 0
1047	5	Carlow	5 0 0	5 0 0	5 0 0
600	5	Carrickfergus (Ld.)	5 0 0	8 0 0	6 5 0
197	10	Carrickmacross (L.)	10 0 0	5 0 0	10 0 0
300	10	Carrick-on-Suir	10 0 0	6 0 0	10 0 0
228	10	Castleblaney (Ld.)	10 0 0	5 0 0	10 0 0
400		Cavan (Limited)	5 0 0		
1300	5	Clonmel Consmrs.	5 0 0	5 0 0	5 0 0
240	5	Comber (Limited)	5 0 0	5 0 0	5 0 0
500	5	Cookstown	5 0 0	5 0 0	
		Coote Hill			
8000	5	Cork Consumers' (Limited)	5 0 0	6 10 0	7 0 0
4000	5	Do., new shares	1 5 0	6 10 0	2 0 0
608	11	Drogheda	11 0 0	7 0 0	14 10 0
420	5½	Do., new shares	5 10 0	7 0 0	7 5 0
		Dublin Hibernian (*see* Untd. Gen.)			
19000	10	*Dublin Alliance*	8 0 0	7 10 0	10 17 6
220	25	Dundalk (Limited)	25 0 0	8 0 0	28 0 0
200	10	Dungannon	10 0 0	7 10 0	12 10 0
871	5	*Downpatrick*	5 0 0	4 0 0	4 0 0
249	10	Ennis (Limited)	10 0 0		11 0 0
240	25	Galway	25 0 0	10 0 0	35 0 0
		Keady			
400	10	Kilkenny (Limited)	10 0 0	7 0 0	11 0 0
		Kilrush			
210	10	Larne (Limited)	10 0 0	5 0 0	10 0 0
150	10	Letterkenny (Ld.)	10 0 0		12 10 0
		Limerick (*see* Untd. Gen.)			
500	10	Lisburn (Limited)	8 0 0	10 0 0	10 0 0
300	5	Lismore	5 0 0	3 0 0	
100	5	Do., preference	3 0 0	5 0 0	
600	15	Londonderry	15 0 0	6 13 4	21 0 0
		Longford			
520	10	Lurgan	7 0 0	6 0 0	7 0 0
		Mallow			
2191	1	Maryborough (Ld.)	0 5 0		0 5 0
		Midleton			
		Monaghan			
		Navan			
		Nenagh			
1000	5	Newry Consumers (Limited)	5 0 0		7½ to 7¾
450	5	Newtownards	5 0 0	7 0 0	6 5 0
200	10	Newtownlimavady	10 0 0	5 0 0	10 0 0
		Omagh	5 0 0	7 10 0	6 0 0
500	5	Portadown	20 0 0	5 0 0	21 0 0
125	20	Portaferry			
		Queenstown	10 0 0	5 0 0	
500	10	Sligo	10 0 0	6 0 0	10 0 0
500	5	Tullamoore	5 0 0	3 10 0	5 0 0
		Tullow			
1600	10	*Waterford*	10 0 0	6 0 0	12 0 0
300	10	Wicklow (Lim.)	10 0 0	6 0 0	10 0 0

The Gas-Works in the undermentioned towns belong to private individuals. Those marked * by the purchase of the shares in extinct companies:—

Aldershot.	Broadbottom.	Ellesmere.	Halstead.	Littleborough.	Peterborough.	Thirsk.
Alford.	Bungay.	Ely.	Harleston.	Lynn.	Pontypool.	Tipperary.
Barking*.	Burntisland.	Enniscorthy.	Harrow-on-the-Hill.	Market Deeping.	Redditch.	Tiverton*.
Beaufort (Brecon).	Chapel-en-le-Frith.	Falmouth.	Hayle.	Mold Green, nr. Hud-	Rhyl.	Waltham Abbey.
Billericay.	Chard.	Farsley.	Holbeach.	dersfield.	St. Ives * (Hunts).	Wem.
Blaydon, near New-	Clare.	Fermoy.	Holt.	Nettlebed.	Sidmouth.	Wexford.
castle.	Crewe.	Ferry Hill.	Hunmanby.	Newport (I. W.), New.	Sittingbourne.	Whitchurch (Salop).
Bodmin.	Crickhowell.	Fleetwood.	Kings Langley.	New Ross.	Spalding.	Whitby*.
Boroughbridge.	Dingwall.	Goole.	Knutsford.	Oakham*.	Stokesley.	Willington Quay &
Bridgenorth.	Eccleshill, near Leeds.	Hadleigh.	Leiston (Suffolk).	Parsonstown.	Stowmarket.	Howdon.
				Penryn.		

The Gas-Works belong to Local Boards or to Municipal Corporations, or to Commissioners acting under special Acts of Parliament, in the following towns:—

Athlone.	Bury (Lanc.).	Enniskillen.	Layton with Warbrick (Lanc.)	Middlesborough.	Ross.	Teignmouth.
Ballinasloe.	Carlisle.	Great Malvern.	Leek.	Milton (Kent).	Rothesay.	Tenby.
Beverley.	Cashel.	Greenock.	Limerick Corporation Works.	Newton (Lanc.).	Salford.	Tralee.
Birkenhead.	Coleraine.	Halifax.	Lytham (Lanc.).	Oldham.	Southport.	Trim (Meath).
Blackpool.	Dalton.	Haverfordwest.	Macclesfield.	Paisley.	Sowerby Bridge.	Wallasey.
Brighouse.	Darlington.	Keighley.	Manchester.	Renfrew.	Stockton-on-Tees.	Walsall.
Burnley.	Devizes.	Kells (Meath).	Rochdale.	Richmond (York).	Stockport.	Wells (Norfolk).
Burton-on-Trent.	Doncaster.	Knaresborough.		Strabane.	Workington.	
					Youghall.	

Share List of Water Companies.

See "Share List of Gas Companies" for Gas and Water Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
			£ s d	£ s d	£ s d
		Airdrie and Coatbridge			
588	1	Alexandria, Dumbarton	1 0 0		0 2 6
800	25	Ayr	25 0 0	5 0 0	25 0 0
		Banbury			
		Belper			
4800	25	Birmingham	25 0 0	6 0 0	37 17 6
4800	25	Do., new shares	22 10 0	6 0 0	33 15 0
6000	10	Blackburn	10 0 0		
		Boston			
		Brighton, Hove and Preston			
8000	25	Bristol	25 0 0	1 8 0	13⅜ to 14¼
		Do., preference			½ to 1 pm.
		Broadstairs		4 0 0	
		Brompton and Gillingham			
5000	10	Bury and Radcliffe	10 0 0	2 0 0	10 0 0
1333	15	Do., preference shares	15 0 0	10 0 0	31 15 0
1333	18	Do., do.	6 0 0	10 0 0	14 0 0
2000	10	Do., do.	5 0 0	4 0 0	5 0 0
2000	10	Do., do.	1 0 0	4 0 0	5 0 0
		Cambridge			
1500	20	Cardiff	20 0 0	7 10 0	29 to 13
1500	10	Do.	10 0 0	7 10 0	14½ to 15
	10	Carlisle	10 0 0		13 to 14
		Cheltenham			
		Chepstow			
		Chester			
		Colchester			
175	20	Colne, Lancashire Consett District	20 0 0	5 0 0	28 0 0
		Dartford			
1250	20	Darwen	20 0 0	2 10 0	19 to 19¼
1400	5	Deal	5 0 0	5 0 0	5 0 0
1481	25	Derby	25 0 0	7 10 0	50 0 0
400	50	Dudley	50 0 0	1 0 0	20 0 0
250	25	Do., pref. shares	25 0 0	4 10 0	
		Dukinfield			
11600	10	Dundee	10 0 0	5 0 0	11 0 0
2670	5	Dunfermline	5 0 0	2 0 0	2 10 0
	5	Durham	5 0 0		
7360	25	Edinburgh	25 0 0	5 0 0	28 0 0
7360	12½	Do., new shares	12 10 0	5 10 0	16 0 0
7218	6¼	Do., do. ¼ shares	6 5 0	5 0 0	7 0 0
5581	6¼	Do., do. do.	2 10 0	5 0 0	2 15 0
2000	25	Exeter	25 0 0	6 10 0	42 0 0
		Falmouth			
		Folkestone			
		Gosport			
	20	Gravesend and Milton	20 0 0	3 0 0	14 to 16
1000	5	Greenock (Shaw's Gravitation)	50 0 0	7 0 0	68 to 70
		Guiseley, n. Leeds			
		Harrowgate			
		Heywood			
1500	10	Kilmarnock	10 0 0	2 0 0	8 0 0
3200	25	Leicester	25 0 0	4 10 0	27 10 0
120	25	Lewes	25 0 0	6 0 0	26 0 0
		Limerick			
720	25	Lincoln	25 0 0	6 15 0	31 10 0
200	25	Do., new shares	25 0 0	4 5 0	26 10 0
		London Comps.—			
47000	10	Berlin	10 0 0	1 0 0	4½ to 4⅝
	25	Chelsea	25 0 0	4 10 0	23 to 25
	25	Do., new shares	25 0 0	4 10 0	23½ to 24½
		Coln			
975000	8k.	East London	Stock	6 0 0	124 to 125
8000	50	Grand Junction	50 0 0	7 10 0	71 to 73
5840	25	Do., half shares	25 0 0	7 10 0	35 to 37
2310	100	Kent	100 0 0	5 0 0	100 to 102
1460	100	Lambeth	100 0 0	5 10 0	103 to 105
4120	50	Do., new shares	50 0 0	5 0 0	51¼ to 53
		New River		141 6 8	£17,400
1560	100	New River London Bridge Annuities		per sh.	
			100 0 0	2 10 0	35 0 0
3036	100	Southwark and Vauxhall	100 0 0	6 0 0	118 to 120
3036	25	Do., do.	25 0 0	5 0 0	28 to 28¼
1265	100	Do., do.	10 0 0	5 0 0	
11064	61	West Middlesex	61 0 0	5 0 0 per sh.	103 to 105
		Liskeard			
		Maidstone			
		Margate			
		Matlock			
250007	Sk.	Newcastle-on-Tyne (Whittle Dean)	Stock	5 0 0	102 0 0
9600	6¼	Do., do.	5 0 0	5 0 0	1 7 6
135	20	Newport, Carisbrooke	20 0 0	4 10 0	26 0 0
		Newport, Mon.			
	10	North Shields	10 0 0		9 to 10
		Norwich			
3600	50	Nottingham	50 0 0	5 0 0	60 10 0
8000	10	Portsmouth	10 0 0	5 0 0	11 7 6
400	5	Ramsey, Isle of Man	5 0 0		
1500	10	Ramsgate	10 0 0	6 0 0	13 to 13½
		Reading			
		Richmond, Surrey			
		Rochdale			
		St. Helen's			
		Scarborough			
		Sheffield			
		Shrewsbury			
		Southport			
11184	10	South Staffordshire	10 0 0		11 17 6
2554	10	Do.	5 0 0		
		Spalding			
21000	5	Staffordshire Potteries	5 0 0	6 0 0	7 5 0
		Stockport			
1800	12½	Stockton and Middlesborough	12 10 0	6 0 0	
800	12½	Do., A shares	12 10 0	6 0 0	
1591	12½	Do., B shares	7 0 0	6 0 0	
4000	10	Do., C preference	2 0 0	5 0 0	2⅜ to 3
24300	5	Sunderland and South Shields	5 0 0	8 0 0	8 10 0
		Tolcross, Lanark			
		Wakefield			
		Warrington			
		Wellington, Salop			
		Weston-super-Mare			
		Weymouth			
		Winchester			
		Wirral, Cheshire			
20000	5	Wolverhampton New Co.	5 0 0	4 0 0	5 0 0
6000	10	York New Co.	10 0 0	5 0 0	11 12 6

The Water-Works in the undermentioned towns belong to private individuals :—

Campbelltown. Chidwall (Lancaster). Hastings, West (Eversfield Estate). Hyde (Cheshire). Ollerset (Derby). St. Leonard's. Stamford. Tunbridge Wells.

The Water-Works belong to Local Boards of Health, Municipal Corporations, or Commissioners acting under Special Acts of Parliament, in the following towns :—

Aberdeen. Abergavenny. Aberystwith. Alnwick. Ashby-de-la-Zouch. Ashton-under-Lyne. Baildon, Yorkshire. Barnsley. Bath. Belfast. Bilston. Birkenhead. Bishop Auckland. Bolton. Bradford. Burnley. Bury St. Edmund's. Carmarthen. Chorley. Cork. Coventry. Croydon. Darlington. Dartmouth. Dover. Dublin. Dumfries. East Stonehouse. Ely. Epsom, Surrey. Farcham, Hants. Glasgow. Gloucester. Halifax. Hastings, East. Haverfordwest. Haworth, Yorkshire. Huddersfield. Hull. Ilfracombe, Devon. Keighley. King's Lynn. Kirkcaldy. Knighton, Radnor. Lancaster. Leamington. Leeds. Leek. Leith. Liverpool. Llanelly. Lytham. Macclesfield. Maidstone. Manchester. Merthyr Tydvil. Montrose. Nantwich, Cheshire. Oldham. Oxford. Paisley. Pembroke. Penzance. Perth. Peterhead. Pontefract. Poole. Port Glasgow. Preston. Pultneytown, Caithness. Rotherham & Kimberworth, Yorkshire. Rugby. Salford. Salisbury. Sheerness. Southampton. Stirling. Swansea. Teignmouth. Warwick. West Cowes, Isle of Wight. Whitby. Whitehaven. Wigan. Windhill, Yorkshire. Wirksworth. Worcester.

Price Current.

CASTINGS, per Ton.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 5 0	2 10 0	2 12 6	3 0 0	3 5 0
1½ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 ,, ,,	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 ,, ,,	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards ,, ,,	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
,, 2nd ,, cold ,,	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ⅜ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
,, ,, ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
,, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples	1 3	0 9	0 8	0 6	0 5	0 4
	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, per Ton.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead, at Leith	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	23 0
Pelaw	7 3	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 6	,, 2nd ,,	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	,, ,, Leith	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	14 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester	5s. 9d.	Barcelona	£25. 0s.
Cork	—	Bordeaux	16 0
Dover & Folkestone	5 9	Boulogne and Calais	7 10
Dublin	—	Cadiz	18 10
Exeter Quay	—	Cronstadt	12 5
Ipswich	5s. 6d. to 5 9	Copenhagen	10 0
London (Pool)	5s. 9d. to 6 0	Genoa	22 0
Lowestoft & Yarmouth	4 9	Hamburg	£8 to 8 5
Lynn	—	Havre de Grace	£9. 5s. to 9 10
Portsmth. & Southpton.	6s. 9d. to 7 0	Leghorn	21 10
Plymouth	7 6	Lisbon	15 10
Shoreham	—	Rotterdam	£7. 10s. to 7 15
Whitstable	6 3	Stettin	10 5
Weymouth	—	Trieste & Venice	22 0

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	50s. 0d. to 55s. 0d.	
Cliff's Fire-bricks, at Wortley	per 1000	55 6	
Ingham's Fire-bricks, at Wortley	,,	55 0	
Fire-clay Retorts	per foot run,	5s. 6d. to 7 0	
Tough Cake Copper	per ton	£98 0s. 0d.	Foreign Spelter ... per ton £17 10s. 0d.
English Pig Lead	,,	19 5 0	English Block Tin ,, 114 0 0
Welch Bar Iron, in London	,,	6 5 0	Banca ,, 114 10 0
Tarred Rope Yarn	per cwt.	26s. 0d.	

DR. J. NORTHCOTE VINEN'S FORTNIGHTLY REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY.—

Week ending.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
Aug. 10	4	15·10	11·37	13·23
„ 17	4	13·60	11·70	12·65

The volume of hydrocarbons averaged 4 per cent.; carbonic acid, a trace; sulphuretted hydrogen, none; ammonia was present on August 6, 9, 13, and 15. The maximum pressure was 3 inches; the minimum, 2/10ths. The ordinary working pressure averaged about half an inch.

SCIENCE IN THE LAW COURTS.—We have recently witnessed, in the Court of Queen's Bench, a rare array of our most eminent chemists. There was not one amongst the number who has not associated his name with some important discovery in science. Two or three of these men have exhibited mental powers of the highest order; and, not only as experimentalists, but as philosophers, they stand in the first ranks before the world. They were in the law court for the purpose of proving one of two things: either that coal-gas, escaping from a pipe in the street, would flow *down* into an area, and so enter the basement of a building, and, forming there an explosive mixture, be fired at the burning gaslights; or, that it would not do so. The trial was not allowed to proceed to the end; none of the defendants witnesses were examined, as, early on the third day, a compromise was proposed and accepted. This fortunately relieves us from the difficulty which must have beset us had the case gone to the jury. Nothing that we can now say will admit of being construed into a reflection on any of the witnesses; they were, indeed, all men whom we, with the world, delight to honour. It is with the principle involved in this, and other similar trials, that we have to deal, and not with the men engaged in those trials. The scientific man should not be allowed to place himself in a position where he may be made to give his influence in favour of an untruth. His vocation is to discover truth, to separate it from error; and his duty is, by the perspicuity of his statements, to prevent the advocate from blinding the jury by any of the arts of the profession. As the chemist or the natural philosopher now stands in a court of law, he does not, he is not permitted to "*speak the whole truth*, and *nothing but the truth*;" he is transformed by influences, amidst which he appears powerless, into a barrister using the mysteries of science, instead of the mysteries of law, to persuade the jury to decide in favour of his client. But the man of science should give the utterances of nature in the most disinterested manner. The moment a man receives a fee to prove a particular point, he goes to work with perverted vision, he avoids everything which tells against the position he is paid to support, and he exaggerates each shadow into a substantial thing, if it appears to aid the cause. If, as lawyers say, scientific men are bad witnesses, it is because there is constantly a struggle in their minds while they are giving evidence. A chemist in his laboratory is one kind of man; in the witness-box he is another. We never yet saw a scientific man at his ease while he is under examination—often have we seen him dreadfully distressed. This can only be because the atmosphere of doubt which envelops a law court is not congenial with the spirit of truth which belongs to the investigator of nature. The principle at present adopted is decidedly wrong, but how are we to remedy it? This, we feel, is, to a great extent, beyond us. We know some half-dozen of our most exalted philosophers and experimentalists who will not enter a witness-box. This is a loss to the public—they fail to obtain the advantage of their great knowledge. We shall never secure the services of our greatest men, as long as we place them at the mercy of a man who is profoundly ignorant of their science, and whose study is to lead them astray from the paths of truth. There appears but one remedy. No man of science should ever enter a witness-box. Where the question submitted to a jury involves a knowledge of science, the judge should submit to men selected by himself and the barristers engaged on each side the question at issue. Left to themselves, they should determine, as far as this might be possible, the truth, and the jury should have the advantage of this determination. Relieved from the pressure of that practised skill which is brought to bear on the scientific witness, the probability is that the "whole truth" would be spoken, and certainly all parties would be gainers thereby.—*London Review.*

Advertisements.

METROPOLITAN BOARD OF WORKS.

APPOINTMENT OF INSPECTORS OF GAS-METERS UNDER THE SALE OF GAS ACT.

THE Metropolitan Board of Works hereby give notice that they are about to appoint THREE INSPECTORS of GAS-METERS (not being makers, repairers, or sellers of meters or gas, or persons employed in the making, repairing, or selling of meters or of gas), for the area within their jurisdiction, exclusive of the City of London. Each Inspector will have a separate district, and will be required to devote the whole of his time to the duties of the office; and his remuneration will be £200 a year, payable quarterly. He will be required to enter into a bond, with or without sureties, as may be determined by the Board, for the faithful discharge of his duties. Candidates for the office must send in applications, addressed to the Clerk of the Board, accompanied by testimonials, on or before four o'clock in the afternoon of Thursday, the 19th day of September next, and no application will be received after that time.

By Order, JOHN POLLARD, Clerk of the Board.
Office of the Board, Spring Gardens,
August 19, 1861.

CAUTION.

TO GAS-METER MANUFACTURERS AND OTHERS.

THE Undersigned hereby caution Meter Manufacturers and others against infringing the exclusive right of the Undersigned to the use of the Screw Adjustment for regulating the Height of the Overflow-Pipes in Wet Gas-Meters, as described in the Specification of the Letters Patent granted to Crosley and Goldsmith on the 19th of April, 1856; as well as against infringing any other portions of that or any other Patent of the said William Crosley; and

NOTICE is further given, that all Infringers of the said Inventions, or any portions of them, will be proceeded against. CROSLEY & CO.,
103, SOUTHWARK BRIDGE ROAD,
LONDON, Aug. 29, 1859.

WILLIAM BLEWS AND SONS'
IMPROVED MACHINE-MADE BURNERS
WROUGHT-IRON BATSWINGS,
FOR RAILWAY STATIONS AND MARKETS,
GAS-FITTINGS, CHANDELIERS,
BRASS AND IRON TUBES OF EVERY KIND
SUPPLIED ON THE BEST TERMS,
AT THE WORKS,
9, 10, 11, BARTHOLOMEW STREET,
BIRMINGHAM.

WALTER MABON, Engineer,
ARDWICK IRON WORKS, FAIRFIELD STREET
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contractor for Gas Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

W. J. HOLLANDS,
IRON MERCHANT AND AGENT,
AND
Wholesale and Retail Charcoal and Coke Dealer, and Grinder,
12, BANKSIDE, and GREAT SUFFOLK STREET, SOUTHWARK, S.E.

All Goods kept in Stock, and supplied at Manufacturers Prices. Cast-Iron Socket, Flanch, Hot Water-Pipes and Connexions, for Gas, Water, and Steam purposes, Rain-Water-Pipes and Guttering, &c. Furnace-Pans and Stable-Fittings. Retorts, Hydraulic Main, Furnace-Work, &c. Lamp-Columns, Lanterns, Cocks and Burners. Wrought-Iron Tubing, &c., of best description. Screw-Cocks, Sluices, and Gas-Valves of every description. Bar, Rod, Plate, and Hoop-Iron Bolts and Nuts. Cast-Iron Columns, Girders, Street-Posts, Watering-Posts, Gutters, Gratings and Railing-Bars, Tank-Plates, and Pump-Castings. Engine, Mill, and Lathe Castings. Planing, Turning, and Boring executed. Cast-Iron Pans, for Soap and Chemical Works. Galvanized Cast-Iron Jars and Pots, for Sugar Refiners. Stourbridge and Newcastle Fire-Bricks, Retorts, Lumps, Tiles, and Clay. Malleable Iron Castings. Pipe-Laying by Contract. Double-Refined Machinery Oil.

Castings made in Town or Country, on the shortest notice, to Sketches, Drawings, or Patterns.

Best Animal Charcoal, for Sugar Refiners, &c.

Best prepared Wood Charcoal. Charcoal and Coke Blacking, and Coal-Dust, and superior strong Coke, for Foundry purposes. Gypsum of the finest and purest quality.

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AGENT FOR
GEORGE BOWER'S PATENTED GAS APPARATUS,
For Villages, Mansions, Manufactories, and Public Establishments, and for Exportation.

WEST and GREGSON, Gas-Meter MANUFACTURERS, &c.
UNION STREET, OLDHAM.

Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.

W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers.

W. C. HOLMES & CO.,
GAS ENGINEERS,
WHITESTONE IRON WORKS, HUDDERSFIELD.

Manufacturers of Gas Apparatus, Gasholders, Iron Tanks, Roofs, &c. &c.

Contractors for the Erection of Gas-Works throughout of any magnitude.

Plans, Specifications, and Estimates prepared.

Makers of the Combined, Condensing, and Purifying Apparatus (especially adapted for exportation), uniting simplicity and compactness with great efficiency and facility of working.

References given to Works where it is in operation.

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER and CO.
(Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W.

Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.

CRUCIBLE and CEMENT CLAYS.

GARDEN EDGINGS, of various patterns.

BUFF and ORNAMENTAL TILES.

CLINKERS and STABLE PAVINGS, noted for hardness and durability, being perfectly non-absorbent.

Shipments on the shortest notice.

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RETORT AND BOILER-SETTERS,
AND CONTRACTORS FOR GAS-WORKS IN GENERAL, FOR MATERIALS AND LABOUR, OR LABOUR ONLY.
OFFICE:
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Contractors at the Chartered Gas-Works, Curtain Road, and numerous Provincial Gas-Works.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

FLEXIBLE GAS TUBING,
VULCANIZED INDIARUBBER HOSE-PIPES,
WASHERS FOR STEAM-JOINTS, &c.

JAMES LYNE HANCOCK begs to inform the trade he has considerably improved the manufacture of his FLEXIBLE TUBING, both PLAIN and GLAZED. Made all sizes in 60 feet lengths.

INDIARUBBER GAS BAGS, fitted complete with Stop-Cocks and Tubes.

All orders to be addressed to JAMES LYNE HANCOCK, Vulcanized Indiarubber Works, Goswell Road, (opposite Spencer Street) LONDON (E.C.).

ESTABLISHED 17 YEARS.

OFFICE for the Procuration of LETTERS PATENT, and the REGISTRATION of DESIGNS. JOSEPH WILLCOCK and Co., Patent Agents and Engineers, Successors to Messrs. Barlow and Co., 89, Chancery Lane, LONDON, W.C.

GRATIS, and post free, "THE INVENTOR'S MANUAL;" also a pamphlet, "*L'Obtention de Patentes Anglaises;*" 500 MECHANICAL MOVEMENTS; the first part of Kinematics, or the Transformation of Motion. By JOSEPH WILLCOCK, C.E., Mem. Soc. of Eng. May be had at the above address, and of any Bookseller. Price 2s. 6d. The second part is approaching completion, and will shortly be announced.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
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WOLVERHAMPTON RETORT WORKS.
ESTABLISHED **1840.**

JOHN EUNSON AND SON,
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

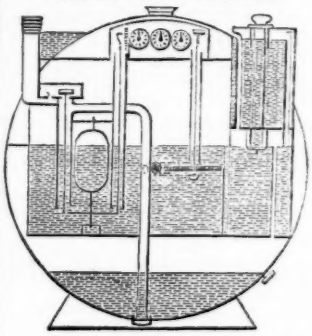
LIVESEY FIRE-CLAY WORKS,
NEAR BLACKBURN, LANCASHIRE.
ORLANDO BROTHERS,
MANUFACTURER OF PATENT CLAY RETORTS,
AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

FIRE-CLAY RETORTS.
JOHN SWARBRICK,
MANUFACTURER OF PATENT COMPOSITION CLAY RETORTS,
FIRE BRICKS OF EVERY DESCRIPTION, SHAPE, AND SIZE, &c. &c.
HIGHER EANAM, BLACKBURN, LANCASHIRE.

These RETORTS are generally used in the Gas-works of Preston, Accrington, Bury, Heywood, Middleton, Rochdale, Ratcliffe; the Mills of Messrs. Horrocks, Miller, and Co., Preston, &c. &c., and are unequalled in having afforded general satisfaction to those who have given these Retorts a trial.
To meet the increasing demand, the Works at Little Harwood have been greatly enlarged; and Gas Engineers who may favour with an Order may rely with confidence on their being promptly supplied with an article not to be surpassed in finish or durability.

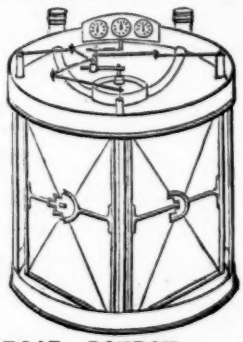
PRICES MODERATE.

PATENT WET METER.



N. DEFRIES,
CONSULTING GAS ENGINEER,
Inventor and Patentee
OF
WET GAS-METERS,
WITH SELF-ADJUSTING WATER-LINE;
DRY METERS,
GAS-HEATING BATHS, OVENS, STOVES,
GAS FIRES with INDESTRUCTIBLE FUEL,
&c., &c.

PATENT DRY METER



FACTORY: DIANA PLACE, FITZROY SQUARE. OFFICE: 406, EUSTON ROAD, LONDON,
Eight Doors from Factory.

Attempts having been made to construct Self-Supplying Apparatus to Wet Gas-Meters upon the Bird Fountain principle,—which, although unerring to supply water in the open atmosphere, has not wholly succeeded so as to be relied upon when enclosed in a Gas-tight Meter Case,—N. DEFRIES begs leave most respectfully to acquaint Gas Companies, and the Public in general, that he has constructed his PATENT WET GAS-METER upon a method entirely different, being founded on the well-known principle of the self-acting supply of the Oil Lamp, which has never been applied for the adjustment of the Meter Water-Line before, and which, by the admission of external air to a chamber sealed from Gas, will never fail to faithfully perform its required function. They are of the very best materials and workmanship, will stand more pressure than is required as the test for soundness by the New Act, are guaranteed to prevent surreptitious burning without detection, and will be kept in repair free of charge for seven years.

N. DEFRIES'S CELEBRATED DRY METERS,

of which more than 80,000 are in use in Palaces, Churches, Chapels, Royal Dockyards, Club Houses, Public Offices, and other Buildings throughout the Empire and Continent, which have done so much in checking surreptitious burning, and simplified the fitting up of Gas.

To remove any doubt of accuracy of measurement his Meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that Building was destroyed by Fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company in the presence of George Lowe, Esq., F.R.S., and other Chief Officers, and found inflexibly correct. Also, on the 9th of June, 1858, at the Western Gas-Works, his Meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests—from the full lighting to a single Jet—and in each case, as in other instances, accuracy was finely indicated.

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LORD REDESDALE'S SALE OF GAS BILL.

All Meters constructed by N. DEFRIES are guaranteed to pass the Provisions of the Standard.

No alteration has been necessary in the Meters he continues to supply to the Chartered, Imperial, City of London, Equitable, and other large Companies, his accustomed range of 1 per cent. over and under meeting all the desired requirements; whereas, by the New Act, a greater departure from accuracy—viz., 2 per cent. fast to 3 per cent. slow—is permitted.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

WHITEHOUSE and CO., Boiler and GASHOLDER MAKERS,
GLOBE PATENT TUBE WORKS, WEDNESBURY,
Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.
Orders promptly executed.

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GASHOLDER MAKER,
WESTBROMWICH, NEAR BIRMINGHAM.
Sir,—I feel great pleasure in expressing my satisfaction at the manner in which you discharged your duties as CONTRACTOR for the TELESCOPIC GASHOLDER, 150 feet diameter and 60 feet deep, erected at this Company's Nine Elm Station in 1857. From that period to the present I have closely watched its working, and have never found the least defect either in workmanship or material.
During the recent heavy gales the Gasholder, although containing upwards of 1,000,000 cubic feet of Gas, showed no perceptible indications of its influence, but worked as freely and easily as usual.
RICHARD JONES.
Engineer to the London Gaslight Company.
Vauxhall, London, Nov. 9, 1859.

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LESLIE'S PATENTS: Licenses for England, Scotland, and Ireland, the 86 Departments of France and Belgium.—60, Conduit Street, LONDON, W.

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References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

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ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Albert Keller, of Ghent, begs to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by him. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communiations, addressed to ALBERT KELLER GHENT, will receive immediate attention.

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MANUFACTURERS OF EVERY DESCRIPTION OF
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A large stock of Fire-Clay Goods always on hand in London, at the lowest wharf prices, at Messrs. CHRISTIE & Co.'s Wharf, 64, Bankside, SOUTHWARK.

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BEST CLASS-HOUSE POT AND CRUCIBLE CLAY.
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Late in the occupation of I. and W. King.
Originally J. Pidcock, Esq.
NB. A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches, 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

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FIRE-BRICK AND TILE MERCHANT,
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RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.
Estimates for Setting, or Bricklayers sent when required.
GAS OVENS IN SEGMENTS OF EQUAL QUALITY.
A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.
N. B.—*Export orders continue to have prompt attention.*

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PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,
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Experimental Meters, Minute Clocks, &c., Station Meters and Governors,
STREET-LAMP GOVERNORS AND LAVA BURNERS,
19 and 20, MARSHAM STREET, WESTMINSTER.

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GLAZED SEWERAGE & WATER-PIPES,
Made up to five feet diameter. Vitrified Pipes, for conveying Water under pressure, made, laid, and guaranteed to stand a required pressure for six months. Every description of sanitary goods.

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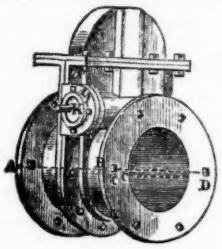

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from 2 inches to 18 inches, price 11s. 6d. to 13s. 6d. per inch diameter

List of prices, with full dimensions of all sizes up to 27 inches, to be had on application.

These Valves are all proved to 30 lbs. on the square inch before leaving the works.

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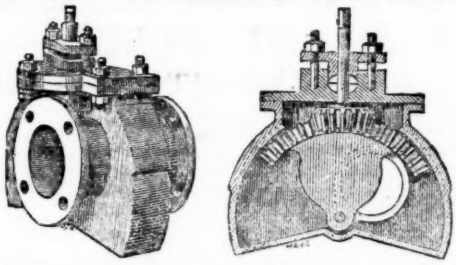
ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.

BEST AND CHEAPEST SLUICE-COCK.



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Above 3-inch diameter, price 10s. per inch. Brass face, 6d. per inch extra.

Can be taken to pieces without being removed from the line of Piping.

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WALTER FORD,

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PADDON and FORD,

GAS-METER AND APPARATUS WORKS,

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A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

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PATENTEE OF

DRY & IMPROVED WET GAS-METERS,

AND

GAS APPARATUS.

All Meters warranted to comply with the Act of Parliament.

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Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards

(Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

WILLIAM RICHARDSON

(LATE OF DUDLEY),

CONSULTING ENGINEER,

PATENTEE OF THE VERTICAL OVEN RETORT

No. 367, PERSHORE ROAD,

BIRMINGHAM.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast Iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, Lamp Columns of various patterns, &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

C. H. is prepared to carry out the warming and ventilation of public buildings, &c.; also civil engineering in general.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

JOHN ROGERSON and CO.,

NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:

12, ROYAL EXCHANGE BUILDINGS.

GAS COAL.

BEAL, WALKER, and CO., Coal and

COKE MERCHANTS, No. 1, Walker's Buildings, SHEFFIELD, beg to inform the Directors and Managers of Gas Companies, that they are in a position to contract for the supply of the different sorts of best Gas Coal, such as best Silkstone, Barnsley, and others, at the lowest prices, which may be had on application at the above Office.

ALFRED PENNY, Gas and

CONSULTING ENGINEER,

WENLOCK IRON WORKS,

21 & 22, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

Gas Stoves, Gas Baths, Gas Cooking

APPARATUS, warranted the best in England, at PHILLIPS'S, the original inventor and manufacturer, and general gas-fitter, &c., 55, Skinner Street, Snow Hill, LONDON, E.C.

PATENT SAFETY ATLAS CHANDELIERS, Sun and Star Burners, Outside Lamps, Patent Reflecting Lamps, Portable Coppers for either Gas or Fuel. Iron Tube and Fittings. Best quality for Gas, Steam, or Hot Water, &c. &c.

GEORGE ANDERSON, Gas and

CONSULTING ENGINEER,

104, LEADENHALL STREET, LONDON (E.C.).

DIRECT-ACTING GAS-EXHAUSTERS,

supplied either with or without Steam-Engines and Boilers.

FOUR-WAY DIAPHRAGM VALVES,

one of which answers the purpose of THREE ordinary Valves, as applied to Purifiers, or in shutting off and passing Station-Meters, Governors, or other apparatus, while the Connecting-Pipes are also much simplified.

RETORT SETTINGS,

designed to be heated by Tar alone, and with a total absence of Smoke.

Illustrated circulars, giving references and every information, may be obtained on application as above.

BENJAMIN GIBBONS, Jun.,

DEEPDALE FIRE-CLAY & BRICK WORKS,

Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,

TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

TRUSS'S PATENT ELASTIC PIPE-JOINT,

FOR GAS AND WATER-MAINS, AND STEAM PIPING,

Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

Drawings, Estimates, and every particular, furnished on application to

THOMAS SEAVILLE TRUSS, C.E., 53, GRACECHURCH STREET, LONDON, E.C.

R. LAIDLAW & SON,

GAS ENGINEERS, IRON & BRASS FOUNDERS,

Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,

GLASGOW;

AND AT SIMON SQUARE, EDINBURGH;

MANUFACTURERS OF

STATION & CONSUMERS METERS, ALL SIZES;

WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES;

HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.

GASHOLDERS;

GOVERNORS, SLIDE-VALVES, &c.;

WROUGHT & CAST IRON ROOFS & HOUSES.

Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*

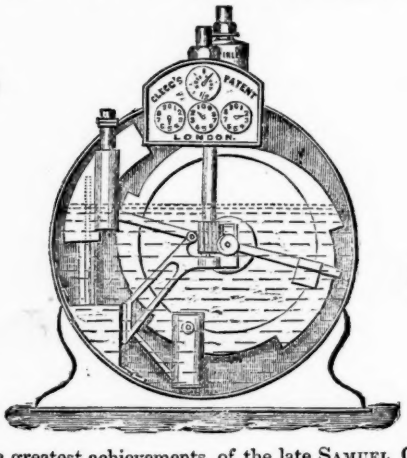
CLEGG'S
NEW PATENT HYDRAULIC GAS-METER.

BISCHOFF, BROWN, & CO.,

MANUFACTURERS

AND

SOLE LICENSEES,



LANGHAM WORKS,

GEORGE STREET,

GREAT PORTLAND STREET,

LONDON, W.

This Meter is the last and one of the greatest achievements of the late SAMUEL CLEGG, C.E., in his connexion with the Manufacture and use of Gas, and, without presumption, it may be confidently affirmed to be the only Meter extant that can be relied upon to measure correctly, to work with the minimum of pressure, and steadiness of light. It cannot be tampered with by tilting or otherwise, and will be of great durability.

This Meter is constructed on an entirely new principle, and, when once adjusted, will always remain the same under all circumstances. The quantity or height of the water in it has no effect on its *capacity*. The immense importance and economy of this to Gas Companies who are obliged to employ so many inspectors, doing their utmost to prevent tampering with the Meters, is so obvious, that they will be able to appreciate its advantages over all other Wet Meters, where the varying height of the water regulates the capacity, and is, in consequence, a perpetual source of annoyance, bad feeling, and litigation, between the Gas Companies and consumers.

The following experiments clearly point out our advantages, and can be readily tested:—

Old Water Meter.

2 pints above the line	.. 5 lights	.. 13½	per cent. fast.
1 „ „	.. 5 „	.. 7½	„ „
Water on the line	.. 5 „	.. ⅛	„ „
1 pint below the line	.. 5 „	.. 5	„ slow.
1½ „ „	.. 5 „	.. 7½	„ „
1¾ „ „	.. 5 „	.. 10	„ „

A fluctuation of 23½ per cent.

Clegg's New Patent Hydraulic Gas-Meter.

Water on the line	1 inch pressure	5 lights	½ per cent. slow.
1 pint below	1 „ „	5 „	½ „ „
2 „ „	1 „ „	5 „	½ „ „
2 „ „	1½ „ „	5 „	right
2 „ „	½ „ „	5 „	„

A fluctuation of ½ per cent.

The Drum, from its peculiar construction, presents scarcely any resistance when moving through the water; and, its weight being taken off its axis by an air vessel, it revolves with the slightest pressure.

The comparative absence of friction in the Drum reduces the wear and tear, and enables it to be made of the strongest materials, which will keep it in working order longer than any other Meter.

It is approved and adopted by the principal London and Country Gas Companies, and is guaranteed to comply with the "Sale of Gas Act," as this Meter, beyond all doubt, works within a shorter range of registration than any other Meter manufactured.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

CROSLEY & CO. are also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

similar to that manufactured by them, and verified by the ASTRONOMER ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by C. & Co. in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." They also supply

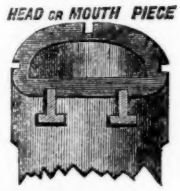
TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M. B NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

MESSRS.

CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Are prepared to supply their Meters duly stamped, under the authority of the Sale of Gas Act, 22nd and 23rd Vic., Cap. 66.

Fees for Stamping charged on Invoice.

FACTORY:

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE, BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books, with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

London: Printed by WILLIAM BOUGHTON KING (at the office of Joseph Clayton, 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, August 27, 1861.

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. X. No. 232—13th YEAR.] LONDON, SEPTEMBER 10, 1861. [Subscription per Ann. { 15s. in Advance / 18s Credit.] Price 8d. Unstamped.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL has become the principal Cannel Coal used in the Metropolis. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. The Crystal Palace was lighted from it in 1851, and the Post-office, and *Times* Office, are at present.

FIRE-CLAY RETORTS and PIPES.

FIRE-BRICKS (marked "RAMSAY") OF ALL DESCRIPTIONS.

G. H. RAMSAY, Broad-chare, New-castle-on-Tyne. Manufactory established in 1801.

METROPOLITAN BOARD OF WORKS.

APPOINTMENT OF INSPECTORS OF GAS-METERS UNDER THE SALE OF GAS ACT.

THE Metropolitan Board of Works hereby give notice that they are about to appoint THREE INSPECTORS of GAS-METERS (not being makers, repairers, or sellers of meters or gas, or persons employed in the making, repairing, or selling of meters or of gas), for the area within their jurisdiction, exclusive of the City of London. Each Inspector will have a separate district, and will be required to devote the whole of his time to the duties of the office; and his remuneration will be £200 a year, payable quarterly. He will be required to enter into a bond, with or without sureties, as may be determined by the Board, for the faithful discharge of his duties. Candidates for the office must send in applications, addressed to the Clerk of the Board, accompanied by Testimonials, on or before four o'clock in the afternoon of Thursday, the 19th day of September next, and no application will be received after that time.

By Order, JOHN POLLARD, Clerk of the Board.
Office of the Board, Spring Gardens,
August 19, 1861.

WANTED immediately, a Working MANAGER for a small Gas-Work near London. Salary to commence at £51. 12s. per annum, with residence, coals, and gas.

Apply to C. R. MEAD, 1, Sugden Terrace, Hill Street, Peckham, LONDON.

GORLESTON and Southtown Gas-WORKS.

WANTED, immediately, a steady respectable Man, who thoroughly understands the Manufacture and Distribution of Gas in Iron Retorts, the Laying of Mains and Services, and the Fixing and the Repairing of Meters. As the Works are small, he will have to perform all the duties required, except during the winter months, when he will have the assistance of a man.

There is a comfortable dwelling-house on the premises.

Applications, stating age and qualifications, with Testimonials of character and fitness, may be sent to C. J. PALMER, Esq., the Secretary, 28, Regent Street, GREAT YARMOUTH.

COWEN'S PATENT FIRE-CLAY RETORTS.

JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE CLAY."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their Works as above.

COWEN'S GARESFIELD COAL AND COKE.
Coal and Coke Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,

Original Manufacturers of Wrought-Iron Gas Tubes and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.

J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.

Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

SOUTH METROPOLITAN GAS-LIGHT AND COKE COMPANY.

NOTICE is hereby given that an ORDINARY MEETING of the PROPRIETORS of this Company will be held at the London Tavern, in the City of London, on TUESDAY, the 1st day of October next, at Two o'clock precisely, to receive the Directors Report and the Accounts of the Company for the half year ended June 30th last, and to declare a dividend for the same period.

By order of the Directors,
THOMAS LIVESEY, Secretary.
Old Kent Road, Sept. 9, 1861.

BLAYDON BURN AND LOW BENWELL FIRE-CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.

WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.

London Agents:
JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

COUNTY and General Gas Consumers COMPANY (LIMITED).—Works at Chertsey, Lea Bridge, Northfleet, Pembroke, Pembroke Dock, Ware, and Walton-on-Thames, producing a gas rental of about £6500 per annum.

Established for the erection of gas-works in provincial towns, or the purchase or leasing of existing works on equitable terms. Application to be made to the Engineer to the Company, Mr. H. P. STEPHENSON, 58, PALL MALL.

TO MANUFACTURING CHEMISTS.

THE Directors of the Huddersfield GAS COMPANY are prepared to receive Tenders for the COAL-TAR made at their works. The contract to commence on the 1st day of January, 1862, and to be for three years, or for such other term as may be agreed upon at the time of making the contract. Any information required may be had on application at the Gas-Works.

Sealed Tenders to be sent to me not later than the 18th day of September next, endorsed "Tenders for Coal-Tar."

By Order of the Board, JOHN BURGESS,
Secretary and Manager.
Gas-Works, Leeds Road, Huddersfield,
August 24th, 1861.

TAR.—Tenders for the Tar which shall be produced at the Surrey Consumers Gas Company's Works, ROTHERHITHE, S.E., during the twelve months, commencing the 1st of October next, will be received there until the 26th current.

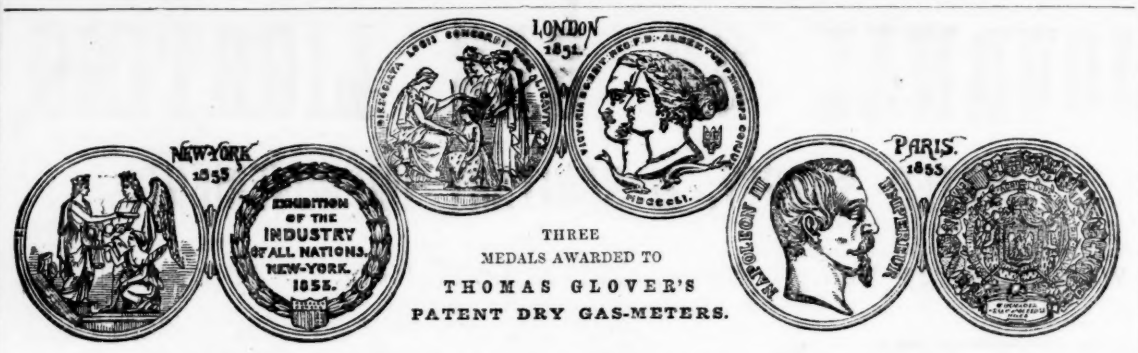
September, 1861.

WANTED, by the Advertiser, a Situation in a Gas-Work as OUTDOOR GAS-FITTER. Age 18. Good characters from last situations.

Address, E. C., 8, Priory Street, Camden Town, LONDON.

THE IMPERIAL IRON TUBE COMPANY,
(SUCCESSORS TO GEORGE B. LLOYD & CO.,)
GAS STREET AND BERKLEY STREET,
BIRMINGHAM,
Manufacturers of Wrought-Iron Tubes and Fittings,
FOR GAS, STEAM, AND WATER.
PATENT GLASS ENAMELLED AND GALVANIZED TUBES,
AND
LAP-WELDED IRON BOILER TUBES.

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED 1840.
JOHN EUNSON & SON,
Gas Engineers, and Manufacturers of Clay Retorts
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.



THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to leave the Meters all in perfect working order.

N. B.—Agents in several parts of England are wanted. Apply by letter, or personally.

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

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STATION-METERS AND GOVERNORS,

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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TO CORRESPONDENTS.

J. H., Wolverhampton.—*Stamped meters only must be fixed for use after the 13th of next month, wherever the Sale of Gas Act has been adopted by the proper authorities, although inspectors may not have been appointed.*

W. Mellor.—*The evidence you allude to was given by Mr. Cox in* 1847, *before the inspecting officers and the parliamentary committee on the Liverpool Guardian Gas Company's bill, and may be purchased at the Parliamentary Paper Office, Great Turnstile, Lincoln's Inn Fields.*

J. J.—*Webster's scheme for obtaining light appears to be a revival of Gurney's "Bude light." The provisional specification was published in this* Journal *on June 4th last, but the patent was not proceeded with.*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 10, 1861.

NOTES UPON PASSING EVENTS.

During the past week, the British Association for the Promotion of Science has been holding its annual meeting at Manchester. Mr. Fairbairn, the president for the year, in succession to Lord Wrottesley, delivered an address on Wednesday evening last—which occupies nearly six columns of the *Times*—full of information and suggestions of the most interesting and useful character. We have selected and condensed the following passages, relating to questions of a practical manufacturing character. After an appropriate introduction, Mr. Fairbairn said, in reference to chemical discoveries, a knowledge of the constituents of food has led to important deductions as to the relative value and commercial importance of different materials. Water has been studied, in reference to the impurities it is so apt to contain. The largest developments of chemistry have been in connexion with the useful arts. For example—aniline, first discovered by Dr. Hofmann in coal-tar, is now used extensively as the basis of red, blue, and green dyes. This discovery will, probably in a few years, render the country independent of the world for dye stuffs; it is more than probable that from England all the world may be supplied with dyes. Chemistry has thrown valuable light upon the composition of steel and iron. In 1857, Mr. C. Binks proved that nitrogen is an essential element of steel. More recently, M. Caron has shown that cyanogen or cyanide of ammonium is the essential element which converts iron into steel. M. Caron has combined iron with nitrogen, through the medium of ammonia, and then converted it into steel, by bringing it at the proper temperature into contact with common coal-gas. There was little doubt that, in a few years, these discoveries will enable the Sheffield manufacturers to replace their present uncertain, cumbrous, and expensive process by a method at once simple, and inexpensive, and so completely under control as to admit of any required degree of conversion being obtained with absolute certainty. . . . M. St. Claire Deville has recently discovered a method of rapidly melting nearly forty pounds of platinum at a time, a metal previously considered almost infusible. . . . . The president then reviewed the progress of applied mechanics during the last century, under the heads of "the three chief aids which engineering skill has offered to national progress, viz., canals, steam navigation and railways." With respect to steam navigation, he observed that, previous to 1812, many days often elapsed before Dublin could be reached from Holyhead; at present, this distance of 63 miles is accomplished in all weathers in little more than three hours. The passage to America occupies eight or nine days, instead of six weeks; while India, by the overland route, may be reached in one month, or one-fifth of the time required fifty years ago. The paddle-wheel system of propulsion has maintained its superiority over every other method yet adopted, as by it the best results are obtained, at the least expenditure of power. But the screw is indispensable in ships of war, because the machinery can be placed in greater safety below the water-line, and sails can be more advantageously used; and the screw is also of great value to ships only requiring auxiliary power in calms and adverse winds. . . . . The cotton machinery of this district (Manchester) had attained considerable perfection before steam came to the aid of the manufacturer, who was previously entirely dependent on water-power. But, when Arkwright patented his water-frames in 1767, the annual consumption of cotton was about 4 million pounds weight; now, it is 1200 million pounds—300 times as much. Within half a century, the number of spindles at work had increased tenfold; while, by superior mechanism, each spindle produces 50 per cent. more yarn than the old system. As late as 1820, the power-loom was not in existence; now, it produces eight miles of cloth per day. Crompton introduced mule-spinning in 1787, with about twenty spindles to each machine; now, three thousand spindles are directed by a single person. At first, the winding or forming the shape of the coss was done by hand; but now, the machine performs the whole operation of drawing, stretching, and twisting the thread, and winding it on to the exact form, ready for the reel or shuttle. In the manufacture of worsted, the spinning-jenny was not employed at Bradford until 1790, nor the power-loom until 1825. The production of fancy or mixed goods from alpaca and mohair wool, introduced into this country in 1836, is a striking example of a new creation in the art of manufacture, chiefly due to Mr. Titus Salt, the founder of the manufacturing town of Saltaire. . . . . Previous to the inventions of Henry Cort, a hearth and a pair of bellows were all that were employed in the manufacture of iron; but, since the introduction of puddling, the iron-masters have increased production to an extraordinary extent, down to the present time, when processes for the direct conversion of wrought iron on a large scale are being attempted. A consecutive series of chemical researches into the different processes from the calcining of the ore to the production of the bar carried on by Dr. Percy and others, had led to a revolution in the manufacture of iron; and, although it is at the present moment in a state of transition, he confidently anticipated that steel and iron, of any required tenacity, will be made in the same furnace with a facility and certainty never before attained. The process of Mr. Bessemer, first made known at the meeting of the British Association at Cheltenham, afforded the highest promise of certainty and perfection of converting the melted pig direct into steel or iron. These improvements in the production of the material must, he considered, stimulate its application on a large scale, and lead to new constructions. He did not hesitate to say that "our wooden walls had seen their last days." "From the commencement of iron ship-building, in 1830, those best acquainted with the subject were all of opinion that

iron must supersede wood in every form of naval construction." He was persuaded that the whole of our war ships must be rebuilt with iron, and defended with iron armour calculated to resist projectiles of the heaviest description at high velocities. He (Mr. Fairbairn) was the first to show by a long series of experiments the superiority of wrought iron over every other description of material in strength and security when judiciously applied in the construction of ships of war. It was reserved for our scientific neighbours, the French, to introduce thick iron plates as defensive armour for ships. . . . . A committee had been appointed by our War-Office and Admiralty for the purpose of carrying out a scientific investigation, and determining—1st. The best description of material to resist projectiles. 2nd. The best method of fastening and applying the material to the sides of ships and land fortifications; and, lastly, the thickness necessary to resist the different descriptions of ordnance. While admitting the possibility of constructing guns capable of destroying ship-plates of the greatest thickness, Mr. Fairbairn was of opinion that a well-constructed iron ship, covered with sound plates of proper thickness, firmly attached to its sides, would for so long a time resist the heaviest guns that can be brought against it as to be pratically shot-proof. But new tools and machines will be required for the production of the large masses of iron required for armour-plates. One of the results of the introduction of wrought iron and correct principles of manufacture, has been the reduction of the weight of guns to about two-thirds of the weight of the older cast-iron ordnance. Thus, great guns, with greater precision of fire, can be worked more easily. . . . . The effect of the introduction of iron into bridge-building, was shown in a comparison of stone, cast iron, and tubular bridges. Stone bridges do not exceed 150 feet span; cast-iron 250 feet; but tubular bridges cross rivers 500 feet in width, without any support in the middle of the stream, and may be extended over with safety up to 1800 or 2000 feet; above that span, the structure would be destroyed by its own weight. The machinery of the present day owes its perfection to machine-tools. Mr. Fairbairn stated that, when he first entered Manchester, the whole of the machinery was executed by hand. There were neither planing, slotting, nor shaping-machines; with the exception of very imperfect lathes and a few drills, the whole of the machinery was executed by the hands of the workmen. After alluding, at some length, to the improvements in manufacturing arms, introduced at the Woolwich and Enfield factories by Mr. Anderson (those improvements having, it may be added, originated in America); to the improved water supply of great towns, and to a project for the supply of the metropolis from the Welsh lakes at an expense of six or seven millions of money; to telegraphs—giving the honours of invention to Wheatstone, Thomson, and Delarive, and particularizing the new system of communication, at small expense, introduced by Professor Wheatstone, by which intercourse can be carried on between private families, public offices, and the works of merchants and manufacturers—this invention enables 1000 wires, in a perfect state of insulation, to be formed into a rope not exceeding half an inch in diameter. Mr. Fairbairn concluded by making the following observations, on the patent laws, in direct reply to Sir William Armstrong:—

Doubtless there are abuses in the working of the patent law, as it at present exists, and protection is often granted to pirates and impostors, to the detriment of real inventors. This, however, does not contravene the principle of protection, but rather calls for reform and amendment. It is asserted, by those who have done the least to benefit their country by inventions, that a monopoly is injurious, and that if the patent laws are defended, it should be, not on the ground of their benefit to the inventor, but on that of their utility to the nation. I believe this to be a dangerous doctrine, and I hope it will never be acted upon. I cannot see the right of the nation to appropriate the labours of a lifetime, without awarding any remuneration The nation, in this case, receives a benefit; and assuredly the labourer is worthy of his hire. I am no friend of monopoly, but neither am I a friend of injustice; and I think that, before the public are benefited by an invention, the inventor should be rewarded either by a fourteen years monopoly, or in some other way. Our patent laws are defective, so far as they protect pretended inventions; but they are essential to the best interests of the State in stimulating the exertions of a class of eminent men, such as Arkwright, Watt, and Crompton, whose inventions have entailed upon all countries invaluable benefits, and have done honour to the human race. To this association is committed the task of correcting the abuses of the present system, and establishing such legal provisions as shall deal out equal justice to the inventor and the nation at large.

In our last "Notes" we made some remarks on the comparative progress of street improvements in London and in Paris, not to the advantage of the former. A recent article in the *Revue des Deux Mondes* gives some useful information as to the means by which the street improvements of Paris, and other cities of France, have been carried out. In the absence of the widely-extended system of loans by private individuals, banks, and insurance companies, which exist in this country of wealth and credit, the French Imperial Government has encouraged the formation of what may be called a "deposit and loan society," under the untranslatable name of *Crédit Foncier*, literally, landed credit. The *CréditFoncier* does not lend its own money, but its paper which the public endorses; "it pours out with one hand the interest of the securities given to lenders, and receives in the other hand the annuities paid by borrowers." It is an association of shareholders finding a certain sum of money as a guarantee for the security of the loans which landed proprietors contract with the holders of the bonds of the association. On the 31st of December, 1860, the total of the loans effected on long terms amounted to 188 million francs. The department of the Seine, at the end of January, 1861, alone figured as debtor for 135 millions; and, out of 56 millions granted to other departments, urban populations had obtained 56 millions. Thus, the original idea of assisting agriculturists in improvements, seems to have fallen through. But it has been revived in another shape. It is not within our present plan to describe the working of this loan association; it will be enough to mention that the Government considered it worth while to assist it with a subvention of 10 million francs, on certain conditions. An attempt to imitate the plan, introduced by Sir Robert Peel in 1844, of lending Government money to landowners for draining their estates, to be repaid by annuities charged on the land—a most successful operation in Ireland as well as in England—failed completely in France, where it was intrusted to the *Crédit Foncier*. In this country, several millions sterling have been advanced and repaid to the Government, and at present the land-loan market has been given up to private improvement societies. The *Crédit Foncier* has, in two years, only advanced about £16,000 for drainage purposes. But, in assisting municipalities, this institution seems to have operated very largely and successfully. Our municipalities and parishes generally borrow more cheaply from banks and insurance companies. With the assistance of the *Crédit Foncier*, the land and building companies have been formed, and carried extraordinary city improvements; for instance, *La Société Immobilière de Paris, La Société de la Rue Impériale de Lyons, et La Société de Port de Marseilles*. The Paris association commenced its operations by purchasing land in the Rue de Rivoli, which had been bought in for want of sufficient biddings at public auction, and building on it thirteen great blocks, and the Hôtel de Louvre. They next built on the site of the Jardin d'Hiver in the Champs Elysées, the magnificent Rue de Marignan. Then they undertook to make a street of shops from the Boulevard Sebastopol to the Rue Saint Denis, and they are now engaged on rows of houses along the Boulevard des Capucines and the Boulevard Malesherbes. So far, their operations are reported to be financially successful. They have borrowed largely from the *Crédit Foncier*, and sold and let their works at a good profit. The society at Lyons does not appear to have been so successful, having only paid its shareholders £4 per cent., although the architectural results have been equally satisfactory. It seems that it is found most advantageous to leave in the hands of a municipality the duty of purchasing the houses and land required for improvement under a compulsory process of valuation; the price to be given by the building company to the municipality having been previously settled. The municipality also executes the paving, &c., of the streets. The shares of the Paris building company are £4 each. We cannot see why an association of the same kind might not be formed, and work profitably for the shareholders and advantageously for the public, in London, in connexion with the Metropolitan Board of Works. We are surprised to find that M. Bailleux de Marisy, the author of the article from which we have taken the above details, not only considers that more has been done, and that too quickly and too expensively, for the adornment of Paris than for its sanitary improvement, but that he actually envies London its public works After slightly sketching the contemplated embankment of the Thames, and the main drainage scheme in course of execution in London, at a cost of three millions sterling, he says—"Such gigantic works are out of the question for Paris, and we do not venture to hope for them. Nevertheless, Paris is as much in want of additional means of communication as London. The great central markets *(halles)* which have recently been constructed are only to be reached by narrow, crooked streets,

and the railway-stations are, for the most part, difficult of access." Thus it appears that the ruling powers of London and Paris have both work to do. London needs not only new streets, but a reconstruction of old streets—the substitution of solid blocks of handsome architecture for the wretched carcases that disgrace the Strand and its continuations. Paris wants water, and sewers, and drains, as well as streets, of a useful and more humble character than those which make the pleasure capital of the world so brilliant. In both instances, we agree with M. de Marisy that building is not the business of the municipality. When some central or local power has obtained possession of the soil, cleared away buildings, and opened streets or squares, it is for private enterprise to step in, and take the risk and profit of architectural improvements. For such conjoint action there is ample room in London; and it is to be hoped that the construction of the Thames embankment will open a new system of public improvements, in which the influence of the Metropolitan Board of Works will assist the enterprise of builders or building companies.

Dr. C. B. Lane has sent us his pamphlet, and we must admit that his publication reads better than his evidence before the Thames embankment commissioners; he shines more as an author than as a witness. Dr. Lane considers that, as the south-side railways are on a high level, and the north-side railways on a low level, the best mode of uniting the two systems, and also the Metropolitan Underground Railway, with the Blackwall and its branches, would be a high-level junction series of lines. The idea has something in it, although it sounded odd enough when our attention was concentrated on the Buckingham Palace line, and the dirty boots of M. P.s at present condemned to traverse the vast expanse between Westminster Bridge and Westminster Hall. Dr. Lane says "from the natural configuration of the ground upon which London, north of the Thames, stands, three of the great lines of railway reach their terminal stations, at or below the natural surface of the ground; exactly the reverse takes place on the Surrey side; he, therefore, contends that advantage should be taken of the new railway bridges of Blackfriars, &c., to abolish terminal stations, and make them continuous. The principle seems sound, but the execution is likely to be remote, according to present appearances.

Little remains to be said on the two frightful railway accidents which have filled the daily papers for the last seven days. It is clear that over-precaution caused the Brighton accident—had there been no signal system at the tunnel, there would have been no accident. Legislation can do nothing more than it has done to prevent such catastrophes. The Brighton company will have to pay at least £50,000 for their signal-man's mistake—a serious tax on a dividend, which will reflect unpleasantly on the position of every high official on the line. This tax indirectly arises from the company having carried passengers a hundred miles for a little more than a farthing a mile—to Brighton and back for 2s. 6d. Money cannot repay the poor maimed and brereaved creatures, but it is the best compensation that laws can give. In too many cases, compensation of any kind is not to be had. Take the case of a ship burned at sea. Depend on it, railway directors and officials would never have accidents if they could have their way. The greatest improvement in railway management may be expected from contracts with competent individuals for working the lines at a rent, thus taking from boards of directors all interference with management, and all patronage and minor appointments.

The Metropolitan Board of Works has hitherto been unfortunate in not having been allowed or able to complete any improvement which was visible to the multitude. The little bit of street from St. Martin's Lane to Covent Garden is too short to produce any effect, and unfortunately the vacant land acquired is so deficient in depth that it will be difficult to induce any speculators to erect satisfactory buildings. It would have paid better to have purchased and cleared away more houses; but this false economy, on the part of Parliament, was not the fault of the board. The great street which will give a clear drive from Westminster Bridge to the south side of London Bridge, will necessarily take time; but the approaching international exhibition affords an opportunity of making street improvements at a trifling cost, which would be seen and appreciated by thousands. At present, after passing through one of the finest drives in Europe, from Piccadilly to Sloane Street, a mean and narrow gut impedes the progress of any great concourse of carriages along the Brompton Road to South Kensington. On each side a useless rampart of what once was garden ground or green turf, now very mangy or very dusty, fills up space between the footways and the highway. The removal of five or six houses, and the levelling of sham lawns and mud-heaps, would give a magnificent roadway with broad footpaths on each side, along which trees might be planted. On such a thoroughfare, the restoration or reconstruction of houses and shops on a more important scale would follow as a matter of course, because it would pay private builders to undertake it.

One of the results of the Crimean war was to take the charge of the mouths of the Danube from Russia, which had systematically obstructed them, and to place them in the hands of a European commission. An Englishman, Mr. Hartley, was appointed engineer. Like all Delta rivers, the mouths of the Danube were obstructed by bars formed by the alluvial soil and sand brought from the interior, which began to deposit so soon as each mouth widened enough to diminish the current. The Sulina was the mouth selected for operations. It was not so wide, and its stream was not so clear, and deep, and safe, as the St. George's mouth; but economy was an object in dealing with the funds of so poor a country as Turkey, and the influence of Russia was thrown into the scale, for doing as little as possible. A correspondent of the *Times* has lately given a detailed account of the result of Mr. Hartley's labours during the last four years. It seems that he has succeeded in obtaining 17½ feet of water where a dangerous shifting bar previously gave only 9 or 10 feet; and this he has done at a cost within his original estimate. He has taken advantage of the fact that a strong current, created by the numerous rivers flowing into the Black Sea, runs southward past the mouths of the Danube, in order to escape through the Bosphorus and Dardanelles into the Mediterranean, and constructed two piers, or rather moles of piles embanked with stones, each 14 feet wide, which continue the natural embankment, and narrow the downflow of the river until the bar of sand, which it carries before it, falls under the influence of the Black Sea current, and is entirely washed away. The northern mole runs east in a straight line, 4600 feet; the southern pier, 3000 feet. These works have diminished, in a sensible degree, the difficulties and dangers of vessels going empty for, or returning from, Ismael and Galatz, laden with corn of the Danubian provinces. It is to be hoped that the importance of this trade to the leading powers of Europe, and an improvement in the finances of Turkey, will enable Mr. Hartley to carry out the plans he recommends in the St. George's Channel mouth, which, were its bar once removed, could be navigated so much more easily and safely. Already, to carry out these corn-distributing works, Mr. Hartley has spent four years in the midst of a desert swamp. How are such services to be acknowledged? Can a C.B. be spared for work so far from court?

A flagrant instance of the unreasonable demands for compensation made on public companies was settled summarily and equitably last week, under the new law, which gives jurisdiction to police magistrates. A manufacturer of patent fuel, paying the South-Western Railway Company, as a yearly tenant, £22 a year, for a hovel or shed, where he worked and slept with his wife, on a "sort of shelf," amongst his coal-dust, claimed about £1300 for removing nine months before his term of notice to quit expired. At the end of that time, he would have been obliged to remove, without any payment whatever. The magistrate awarded him £75. A similar sum was awarded in another case, where £675 had been claimed; and, in a third case, £370, instead of £1500 demanded. A few such decisions will discourage the organized robbery of public companies.

The following are the rates adopted by the commissioners of the exhibition of 1862 for the distribution of medals, as rewards of merit, in sections 1, 2, and 3:—

These medals will be of one class, for merit, without any distinction of degree. No exhibitor will receive more than one medal in any class or sub-class. An international jury will be formed for each class and sub-class of the exhibition, by whom the medals will be adjudged. Each foreign commission will be at liberty to nominate one member of the jury for each class and sub-class in which staple industries of their country and its dependencies are represented. The names of the foreign jurors must be sent to Her Majesty's commissioners before the 28th of February, 1862. The British jurors will be chosen in the following manner:—Every exhibitor will name three persons to act on the jury for each class or sub-class in which he exhibits; and, from the persons so named, Her Majesty's commissioners will select three members of the jury for each such class or sub-class. Her Majesty's commissioners reserve to themselves the power of modifying these arrangements in any particular case where it may appear to them that the

strict application of the principles of these decisions would be attended with injustice. The names of the jurors will be published in March, 1862. The juries will be required to submit their awards, with a brief statement of the grounds of each, to Her Majesty's commissioners, before the last day of May, 1862. Should the reasons assigned for any award appear insufficient, or should no reason be given, Her Majesty's commissioners reserve to themselves the right of confirming or rejecting it. The awards will be published in the exhibition building, at a public ceremony, early in the month of June, 1862. They will immediately afterwards be conspicuously attached to the counters of the successful exhibitors, and the grounds of each award will be briefly stated. If an exhibitor accept the office of juror, no medal can be awarded in the class or sub-class to which he is appointed, either to himself individually, or to the firm in which he may be a partner. The medals will be delivered to the exhibitors on the last day of the exhibition.

The arrangements are as satisfactory as could be expected under the circumstances. As tests of merit, the exhibitors might just as well play at pitch-and-toss for the medals. The Royal Agricultural Society has again been confounding the amateurs who pay any attention to its implement prizes. After a very elaborate trial, the prizes for reaping-machines have been awarded, and now all three of the different machines produced in 1853 have been rewarded twice, and no farmer, from reading the series of reports since the first trial of reapers in 1851, can form the least idea as to what machine is likely to be most useful to him. The reason is obvious. It is almost impossible to find the judges, or the tests, or the time needful for testing the merit of any manufactured production.

The following are the leading points of Mr. Glaisher's minute description of the process of removing the great water barometer from the hall of the Royal Society to the Crystal Palace, which he successfully accomplished, with the assistance of Mr. Negretti of Hatton Garden:—

On the removal of the Royal Society from Somerset House to Burlington House, the council, at my request, placed the water barometer at my disposal, which had been erected in the hall, at the foot of the staircase, by the late J. F. Daniel, Esq., D.C.S., in the year 1832. The directors of the Crystal Palace Company agreed to receive it, and the first operation—viz., the removal of the barometer from Somerset House—was effected, all arriving in safety at the palace, with the exception of the breakage of about 1½ foot from the lower end of the barometer-tube. Originally, the tube was filled by means of a copper steam-boiler, set in brickwork over a fireplace immediately under the barometer itself, so that the tube could be dropped into the boiler, which has since formed its cistern; but this plan did not seem to be the best possible, or, indeed, available at the palace; therefore, Mr. Negretti proposed to use an auxiliary boiler outside the building. The object in view was, first, to boil the water in the cistern, suffering the steam to escape by a cock for some time, and then, by closing the cock, to drive steam through the tube till it escaped in a strong jet from its upper extremity, and then to boil the water in the tube till it issued from the top. By this means, all air would be removed from the sides of the tube, and expelled from the tube itself when this operation had continued long enough to temporarily seal the top, while the water was still flowing out; and ultimately, by means of the blow-pipe, to hermetically seal the tube. During Monday, Tuesday, and Wednesday, August 27, 28, and 29, Mr. Negretti was engaged at the palace preparing everything, and with great dexterity joined a piece of glass on the broken end of the tube, of the same diameter as itself, and also joined another piece of glass on to the extremity, terminating in a small aperture. On Thursday, Aug. 30, an auxiliary boiler was planted outside the building for generating steam, a pipe from which led to the boiler, under the barometer itself, into which distilled water of sufficient quantity had been placed, precautions having been taken to connect the pipe from the outer boiler with that in the inner boiler with a portion of flexible tubing, which would first yield, if anything went wrong. After the connexion was made, in about half an hour a current of steam issued from the cock. When this had continued for some time, the cock was closed, and the steam ascended into the tube, being at first condensed by the upper part of the tube, and ultimately rushing out at the top with considerable velocity. Water then ascended into the tube, and it was an anxious moment to watch the boiling water reach and pass where the tube had been joined, which, however, had been so admirably performed that all anxiety on this head soon ceased. After a time, the upper extremity, while steam was rushing out, was closed, when the water ascended the tube, and soon reached a point 32 feet from the surface of the water in the boiler below. After this, it was driven up, by steam, to very nearly the top of the continuation of the tube; but it did not reach quite up to the sealing-point. The top of the tube was therefore opened, the water fell, and the operation was repeated. It was eminently successful, and the tube was finally closed by the blow-pipe, and the column of water reached nearly 33 feet without the slightest speck of air-bubble being perceptible. On Friday afternoon, Mr. Negretti and I found the column of water 32 feet 9 inches in length, as measured from the surface in the cistern. This is equivalent to a column of 28·84 inches of mercury, considering the specific gravity of mercury as 13·624. The reading of a mercurial barometer, at the same time, was 29·86 inches; the difference between these two readings is 0·98 inch, and this difference should indicate the elastic force of aqueous vapour at the temperature at the time—viz., 78°, if both instruments be correct. The elastic force of aqueous vapour at the temperature of 78° is 0·96 inch, differing by 2/100ths of an inch only from that indicated by the water barometer, and completely satisfied me as to the accuracy of the operation, thus proving that the space above the water was free from air. The instrument is fixed in an angle in the tropical department, and near the great tree. The top of the column of water can be seen from the first gallery, and, as that which causes a variation of an inch of mercury will cause a variation of more than a foot in the column of water, so the changes in the latter will be more than twelve times as great as the former. Many oscillations, therefore, may be seen in the water, which cannot be seen by the mercurial barometer, and in gales of wind or heavy storms it will be highly interesting to watch its action.

EXTINCTION OF FOUR-SHILLING GAS IN LONDON.

We intimated, in our last number, that it was the intention of the three gas companies that supply the City of London to assimilate the price of gas within the City to the rate charged in most other parts of the metropolis. The advance from 4s. to 4s. 6d. has since been formally announced to their customers in a joint circular, of which the following is a copy:—

London, Sept. 2, 1861.

Sir,—The Legislature having, after full inquiry, passed an Act for regulating the supply of gas to the Metropolis, requiring, under heavy penalties, a greatly-increased standard of illuminating power and purity, which will necessarily involve an increased cost of production, we beg to inform you that the companies supplying the City of London with gas will, on and after Michaelmas next, be brought under the provisions of that Act, and that the future charge will be at the rate of 4s. 6d. per 1000 feet for the ordinary coal-gas.—We are, sir, your obedient servants,

R. A. Gray, Chairman,
City of London Gaslight and Coke Company.

S. Adams Beck, Governor,
Chartered Gaslight and Coke Company.

Thomas Dakin, Chairman,
Great Central Gas Company.

The plea on which the advance in price is founded is scarcely consistent with the fact that the average illuminating power of the gas supplied in the City has, for some years past, exceeded the standard prescribed by the Metropolis Gas Act—if the reports periodically made by Dr. Letheby of the quality of the Great Central Company's gas may be relied on. It may be inconvenient to have a minimum standard of 12 sperm candles imposed—from which no diminution is to be permitted, excepting under special circumstances—and the test for purity is almost impracticably severe; but the real truth of the matter is, that 4s. per 1000 feet has never been found a remunerative price for gas of such quality as the citizens of London have been supplied with, and as they have the right to expect. That opinion we have again and again expressed, and we continued to maintain it, though the seeming prosperity of the Great Central Company, which was established to supply gas at that low price, for a time seemed to contradict our assertions. It was, indeed, publicly stated not long since, by the chairman of the City of London Company, that, had it not been for the saving effected by the introduction of clay retorts, that company must have been ruined by the continued supply of 4s. gas. Though that, and other improvements in the manufacture of gas, have enabled the company to stand their ground, and gradually to increase their dividends, the amount of profits divided is yet small for such undertakings, and the directors have, no doubt, gladly availed themselves of the sanction of Parliament to obtain adequate remuneration for the outlay of their capital. If the statement published a few weeks since be correct—that the Great Central Company took the initiative in proposing the recent advance in price—it would be a remarkable corroboration of our representations, that gas of good quality could not be supplied in the City for 4s. per 1000 feet, at the time that company was established.

The Great Central Company were bound by their Act of Incorporation to supply 4s. gas, and most probably strong opposition would have been made to any attempt to amend that Act, although the many adverse circumstances that have occurred rendered it essential to them to raise the price, especially since Parliament has prescribed a higher standard of the quality of gas. To that company more particularly, therefore, the Metropolis Gas Act is an unexpected boon, that has come to relieve them from the difficulties under which they were struggling; and, thanks to Messrs. Hughes and Beal, they have thus gained by a side-wind more than they could have expected to have achieved by their own most assiduous efforts.

The City gas companies generally must feel greatly indebted to those gentlemen whose "Herculean and incessant assiduity"—to use Mr. Hughes's own favourite expression—has succeeded in placing them in a position that must insure their prosperity; and, ere long, we shall probably have to record some suitable acknowledgment from the gas companies to the two leading instigators of the agitation against gas monopoly. The gas consumers, to whose sense of gratitude Mr. Hughes more especially appeals for a recognition of his services, may think differently of the result of his Herculean labours, and may not be inclined to appreciate them so highly as he expects. It is probable, indeed, that the citizens will now feel stronger objections than before to contribute towards the expenses of obtaining the Act which sanctions an increase in the price of gas, however reasonable such an advance may be.

Some of the newspapers have, as might be expected, seized

the occasion of the advance in the price of gas in the City, to raise an outcry against the gas companies generally; but, in ignorance of the real facts of the case, they make strange blunders. The *Observer*, which leads the way, though claiming for the Metropolis Gas Act the merit of having placed the companies "somewhat more under control than they were," is so ignorant of its provisions as to assert that the other gas companies in the metropolis will quickly follow the example of those in the City, and raise their price, and that the gas consumers, having no means of changing their supply, "must take the gas at the price the companies ask, or go without." The writer does not seem to be aware that the price charged in the City, has been for years 6d. per 1000 feet less than in other parts of London, and that the effect of the advance will only be to equalize the price of gas throughout the metropolis, with one or two exceptions. He seems also to be ignorant that the Act prohibits the other companies from increasing the price to private consumers above the rate charged on the 1st of January, 1860, unless special circumstances should warrant it, of which circumstances, the local authorities of the district are to take cognizance; and, if they dissent, the question is to be settled by arbitration. It is said that gas can be supplied now at 20 per cent. less than it could twenty years ago: but the impartial censor of the gas companies omits to state that, during the last twenty years, the price of gas has been reduced in a still greater ratio. The conclusion at which the *Observer* arrives is, that in consequence of the gas companies having combined together, to form a monopoly, several parishes ought to combine and have one gas-work for the group; or, better still, they ought to "adopt the plan of Mr. Croll, the celebrated gas engineer, and have two or three large gas-works for the entire metropolis." Let the parishes but combine together, and it is asserted that the companies, when they found what was about to be done, would gladly dispose of their plants to the local authorities, and the Manchester system is held forth as the *summum bonum* to be attained by the London gas consumers.

The *Daily Telegraph* having been furnished with a copy of the Great Central Gas Consumers Company's Act, imagines itself in full possession of all the facts of the case, and assumes that the three City companies are the only gas companies in London; the Metropolitan Board of Works having had transferred to it the power of lighting other portions of the metropolis. The views of the writer being thus circumscribed within the boundaries of the City, he is enabled to see with a distinct vision the evils of reckless competition, as instanced in the formation of the Great Central Company, and he announces, as a maxim of indisputable veracity, "If you wish arbitrarily to raise the price of any commodity in the open market, get up a public company for the purpose of *lowering* the price." We most cordially agree with the writer in that sentiment, and we admire his sagacity the more as it is the opinion we have expressed time out of mind. We regret that we cannot go along with this sage philosopher in all his statements, some of which we must confess exhibit a woful ignorance of facts accompanied by apparent delusions. He states that the signatures to the circular from the City gas companies, is "led off by the signature of that very company which has been statutably bound to supply gas at the rate of 4s., with a hope held out to the consumer that it should be reduced to 3s. 6d. or even 3s.;" but, had he known the signatures of the companies, he would have seen that the company he speaks off is the last, and not foremost, on the list. We lament that his eyes should have been offended by "the phenomena of intermittent light and of impurity," which are said to have increased. At the same time, we approve of his discretion and modesty in not disclosing "the phenomena of impurity," which appear to have shocked him; and only trust that the gas companies did not take part in any such phenomena. Our sage is still more under delusion when he speaks of the probable intentions of the City gas companies and of Parliament. He says that "if the companies can make good a right at law to extort that higher payment, there is nothing to prevent them from still further raising their tariff to 9s., if they please." He appears to regard the Act of Parliament by which the price of gas is fixed as nothing; and he further exhibits his contempt of the words of the Metropolis Gas Act, by asserting that the Legislature did not design to make a monopoly, although the preamble distinctly states that, "it is expedient that such districting (which constitutes the monopoly) should receive the sanction of Parliament." There is one point which seems to have escaped the notice of these declaimers about monopoly and extortion to which we wish particularly to direct their attention—viz., that in the City of London there is no monopoly of the supply of gas; yet, nevertheless, it is against the gas companies in the City, where competition has been strongest, and where it still exists, that complaints are now most violent.

Circular to Gas Companies.

The return moved for by Mr. Beecroft of the expenses incurred under the authority of the Treasury up to the 30th of June last, in carrying into effect the Act for regulating measures used in the sales of gas, exhibits a remarkable instance of the wasteful expenditure of public money under the direction of incompetent or conceited officials, who act without responsibility. From this return, it appears that a sum of £2911. 12s. 9d. has been expended in providing the standard measuring instruments; £509. 4s. 5d. in preparing a room at the Exchequer-office for their reception; and that a further sum of £237. 10s. 7d. has been paid for verifying and stamping sixteen gasholders, two cubic foot bottles, three transferrers, and one weight. Nor does the £3658. 7s. 9d. thus expended represent the whole of the public money that is to be squandered before the requisite standard instruments are completed, because nine gasholders intended for the metropolitan cities have yet to be completed and paid for; and, as they are all to be finished on the same extravagant scale as the three that have been mounted at the Exchequer-Office, we may presume that the sum total will amount to several thousands of pounds more. We have no hesitation in saying that one-fourth part of the money already paid ought to have covered the whole expense of providing the requisite standard instruments, had the arrangements been intrusted to those who knew what was required for the practical working of the Act, and had fitting persons been employed for making them. Messrs. Donkin and Co. have received £2068. 19s. 4d. for the three perfected gasholders, and for the partial construction of nine others, whilst Mr. George Glover has pocketed £471 for looking on. The Astronomer-Royal, under whose directions these expenses are stated to have been incurred, was somewhat staggered, it appeared from a previous return, at the cost of the three first "gas-measurers," as he persists in calling them, and before giving orders to Messrs. Donkin and Co. to make the nine others, he wrote to the Treasury for their instructions; suggesting at the same time that a less expensive kind of standard might be suitable for Dublin and Edinburgh. But no such hesitation disturbed the mind of Mr. George Glover, who, without having received any authority, on his own motion, gave orders to Messrs. Donkin and Co. to execute the whole of the standard gasholders on the same scale of extravagance as the first three. Thus we find "Mr. Glover of the Exchequer," taking upon himself to expend several thousand pounds of the public money in the execution of works for superintending which he will no doubt receive further recompense. Such conduct on the part of a subordinate officer would, in ordinary business transactions, have been followed by his instant dismissal; but, so far as we learn, that favoured individual still discharges the onerous duty of looking at the progress making by Messrs. Donkin and Co. in spending the public money. Those eminent engineers may have constructed the standard gasholders with all the care they would have bestowed on the construction of a transit instrument, or of a calculating machine, and the workmanship may possibly be worth all the money, but that is not the kind of thing that was wanted for measuring gas; and the expenditure of upwards of £2000 in making three gasholders holding respectively 1, 5, and 10 cubic feet, seems perfectly fabulous, and might lead foreigners to suppose that our standard gas-measures were made of either gold or silver.

The whole proceedings in attempting to carry the Sale of Gas Act into operation have been characterized by red-tapeism, routine, and favouritism, and, under their combined influence, the most unfitted persons have been appointed to do the work—from the Astronomer-Royal down to Mr. George Glover—and the result has been a continued series of blunders, of obstructions, and of extravagant expenditure, of which the parliamentary paper just issued presents ample evidence. Had red tape been able to appreciate, and had it the energy to look for the fitting men, the work would have been effectually

done long ago, and at one quarter of the cost. But scientific pedantry was allowed to take the place that should have been occupied by common sense and judgment; and, while the services of such men as Dr. Frankland, Mr. Pole, and Mr. Siemens, were to be obtained, whose judgment would have been accepted with respect by all, an ex-functioneer of the defunct Board of Health, himself a speculator in patents, was appointed to superintend the construction of the standard instruments, though incapacitated by the Legislature from taking any official position in the administration of the Act by his intimate connexion with a manufacturer of meters. That connexion was also rendered more objectionable since it was at the instigation of that meter maker, for his benefit, and by his agency, that a sham testing clause was introduced into Lord Redesdale's Act.

On and after the 13th of next month, the fixing of an unstamped meter for use in the towns wherein the Act has been adopted, will render the party fixing it liable to a penalty of £5; and, as yet, very inadequate means have been provided for doing what the Act requires. In addition to the 91 towns noticed in our JOURNAL of the 27th of March, 1860, the Act has since been adopted in Aberdeen, Carlisle, Edinburgh, Kingston-on-Thames, Manchester, Middlesboro', Oldham, Salford, and in the metropolis, amounting together to 100 cities and boroughs, and one county (Gloucester). On the 30th of June last, only eight of these had obtained stamped gasholders, and we believe that not more than four or five others have since been supplied; so that there is little prospect of the whole number being provided with stamped instruments by the time they will be wanted. As the person temporarily engaged at the Exchequer for the purpose of stamping the standard instruments is paid for his services one guinea and a half per day, and his assistant 30s. per week, it is scarcely to be expected that they will hasten the termination of their engagements by unusual exertions. At the rate of progress already reported, the expenses seem to be about £13 per gasholder stamped!

Strenuous efforts are being made to procure the reinstatement of Mr. Taunton in his office of inspector of meters for the City of London. Among other means employed, it is rumoured that his friend, Mr. Thomas Glover, has served the justices with a notice, that they had no legal authority to appoint a successor to the office, inasmuch as the Amendment Act of last session confers the power of appointment on the Metropolitan Board of Works, and that he shall hold the justices responsible for any damage he may sustain from the illegal stamping of his meters. We believe the justices have referred the question to the Home-Office; and that they have, in the meantime, suspended the stamping of any of Mr. Glover's meters. He is thus caught in his own net; and it is to be hoped that the satisfaction he feels at having made a desperate effort on behalf of his friend may console him for seeing the meters of rival makers stamped by the only inspector as yet appointed for the metropolis, while his own meters are waiting for the decision of the Attorney-General, who may possibly be spending the vacation on the continent. Mr. Sporne, the new inspector, has been actively at work, in defiance of Mr. Glover's protest against his appointment; and, having ten gasholders at command, several hundred meters have been already verified and stamped. The Metropolitan Board will meet on the 20th inst. to appoint three more inspectors, and we trust the persons appointed will possess the requisite qualifications to entitle them to the confidence of the manufacturers and of the public.

The dispute between the Local Board of Reading and the gas companies of that town, respecting the charge for public lighting, has not been arranged; and, as Mr. Hughes has been consulted about the matter, it is not likely to be settled amicably. Under his influence, a specification was drawn up, the conditions of which were not only most objectionable, but impracticable. This specification, and the general question at issue between the local board and the companies, were submitted by them to Mr. Spice, whose reports we have inserted in another column. Mr. Spice enters into the subject with much vivacity, and at great length, and he completely exposes the fallacies of the statements made at the meeting of the board, to which we briefly adverted when noticing the published report of the proceedings. He shows that the cost of gas at Reading cannot be less than 6d. per 1000 feet in excess of what it can be made for in the great gas-works in London; and that, as 4s. 6d. is considered a reasonable price in the metropolis, where the supply is much greater, and the consumers more concentrated, the people of Reading have no reason to complain of a price which is, substantially, 5s. per 1000 feet to consumers. In a letter we have received from Mr. Dyer, of Burton-on-Trent, relative to gas affairs at Reading, he states that there has been no competition between the two companies in that town since 1858; in which year, when manager of one of the companies, he was instrumental in bringing about an agreement between them to supply separate districts.

Mr. Flintoff is continuing the agitation for cheap gas at Newcastle by publishing letters in the papers to show that gas ought to be supplied to the consumers in that town for 2s. 3½d. per 1000 feet. He pledges himself, if a new company be formed, to find a contractor who will supply gas to the company at 1s. 5½d.; and he challenges contradiction to his figures in public discussion. He may safely throw down the gauntlet, for he knows full well that there are good reasons, independently of the question in dispute, why it will not be taken up. Without looking closely at his estimates, they exhibit sufficient on the surface to show that they are not to be relied on. A parliamentary committee, and not a packed meeting of gas consumers, is the tribunal before which all such matters must, eventually, be brought, and it is there that the accuracy of such estimates as Mr. Flintoff has just formed must be disproved.

We are compelled to defer the further consideration of Mr. Hughes's publication on "Gas Legislation," till our next issue, but it appears from a circular, bearing date the 26th ult., and addressed by this gentleman to all the town-clerks and clerks of lighting commissioners in the kingdom, that the attempts to sow dissatisfaction between the producers and manufacturers of gas is to be continued on an organized system. The circular which is marked [A], states that the writer is about to publish a continuation of the tables relative to public lighting, which were issued in September, 1859, by the managers of the metropolis gas inquiry, and he requests answers to the following seven questions.

1. Price paid for each public lamp?
2. Do the lamps and posts belong to the town or to the gas company?
3. Does the company light, extinguish, paint, and repair?
4. Number of hours per annum during which each lamp burns?
5. Cubic feet per hour consumed by each lamp, as per contract?
6. Cubic feet per hour consumed, where this has been ascertained, either by meter or by experiment?
7. Price per 1000 feet of gas to the private consumer?

The object for which this information is sought, is doubtless to be able to show that in many places the public lamps are supplied with gas at a lower price than is charged to the private consumer, and in the end the prices may in such cases be equalized—a result which has in most cases attended Mr. Hughes's "Herculean labours" in London.

Correspondence.

THE READING GAS COMPANIES.

SIR,—I believe your journal is referred to pretty generally as an authority, both by gas managers and proprietors of gas stock, not only for information as to the progress being made in the art of gas manufacture, but also in matters of fact in all that relates to the interests of gas proprietors and gas consumers; hence it is desirable that all who supply you with information should be accurate and truthful in their communications; but, from your remarks in your issue of the 13th of August last, in reference to the two gas companies at Reading, I am led to believe that such is not always the case.

Having been mainly instrumental in bringing about an agreement between the two companies, and in arranging the terms and details of that agreement, whereby they were bound to each other for a term of ten years, commencing from the 9th of July 1858, so far as it relates to the supply of private consumers, and from the 1st of September 1858, so far as it relates to the public lamps, and having a copy of that agreement before me, I am enabled to state in contradiction to your assertions that, from the dates I have mentioned, each gas company at Reading has been in precisely the same position as though the other company did not exist there; each has its district, in which no new customer can get supplied but from the company to whom such district belongs. No consumer is at liberty to leave one company and go to the other, but must remain with the company by whom he was supplied at the date I have mentioned, excepting those who were transferred together with certain mains at the time of the arrangement between the two companies; and, in consequence of that arrangement, each company has also its district in which it supplies the public lamps free from competition by the other, and, as it was urged that

this arrangement was for the benefit of all concerned, the local board of health offered no opposition to it in respect to the supply of the public lamps.

If, then, it be a monopoly where gas consumers are confined to one company for their supply, it is not correct to say there is no monopoly at Reading, where they have not to pay the additional 1s. per 1000 feet for the privilege of free trade, but in consequence of the great disproportion of the capital invested in these works to their actual value and capabilities. In 1858, the share and borrowed capital of the old company was about £18,000, and the quantity of gas manufactured in that year less than 15 million cubic feet. Except as a warning to the shareholders of other companies, it may not be of much service now to inquire how such a sum could be expended on such a work, but we find £1000 expended for an Act of Parliament. It must not be supposed that each company has provided a work capable of supplying the whole town, and have now to share the customers between them, for the storeage capacity of both works together is only about equal to the daily make of gas by each in mid-winter, and neither is capable of supplying any very large increase on the present consumption without incurring additional outlay of capital in enlarging their works and mains.

I may also add, that no alteration of the terms of supply, either to public or private consumers, has been made by either company since the arrangement, except by mutual agreement between themselves, and both companies charge the same prices in all respects.

My reason for not addressing you earlier on this matter, is, I expected you had been misled by some person unacquainted with the facts, and I waited for those who represent the companies, and whose love for truthfulness should have led them to set you right, to have done so.

I may add, in conclusion, that the statements made by the gentleman connected with the Board of Health concerning what is done in other towns—are correct, so far as they relate to Burton, and as reported in the local papers that published the proceedings to which you refer. CHARLES DYER.

Burton-on-Trent, September 6th, 1861.

THE METROPOLITAN BOARD OF WORKS AND THE SALE OF GAS ACT.

SIR,—I beg to thank you for inserting in the last impression of your JOURNAL, under the above head, the letter which I addressed to you on the 19th ult., and, as your next number will be the last that will appear previous to the meeting of the Metropolitan Board of Works on the 20th instant, when, I presume, the contemplated arrangements will be made for carrying into effect the Sale of Gas Act in the metropolis, I shall feel much obliged if you will allow me, through the same channel, to call the attention of that board to the fact that the majority of the meters manufactured during the year are usually supplied and fixed during about five of the autumnal and winter months, say from October to February inclusive, and the greater portion of those again are generally fixed before the end of December, so that taking the figures employed in my former letter as representing the number of inspectors that would be required to test the 70,000 *new* meters made per annum on the Middlesex side of the Thames at upwards of ten (assuming the operation of testing to be going on uniformly throughout the year), also taking into consideration the fact that, in consequence of the impossibility in the present instance, from the advanced period of the year, to get a sufficient number of meters tested and stamped before the busy season commences, it is obvious that ten inspectors will be very much too small a number to meet the present emergency, and that there should consequently be some provision made for the forthcoming season to stamp the whole number of meters required, within the period of say four months, because it would be extremely inconvenient not to be able to obtain the whole of the meters stamped which are necessary for the busy season some time before its expiration. Taking, therefore, this view of the case, and basing my calculations on the statistics and facts referred to in my former letter, it would require (to meet the demands of the forthcoming season now so close upon us) upwards of thirty-one inspectors to get through the work of testing and stamping (even on the old system) during four months of the busy season, the *new* meters made throughout the year in Middlesex alone; for, though the meters may have required twelve months in their manufacture (many being held in stock), they may be chiefly supplied and fixed during four or five months of the winter season.

Then, again, with regard to the employment of only three 10-feet gasholders (as the three 1-foot holders ordered will be found to be more expensive than larger ones, in proportion to their size, while they will fill spaces in the establishments which ought to be occupied by larger instruments, and in practice will be of comparatively little or no use), I think you will agree with me that the employment of only three useful instruments will be even more disproportionate to the work to be done than the number of inspectors proposed is to the duties to be performed by them, because one inspector might advantageously use three or more gasholders at the same time—say one for testing the accuracy of registration of a meter at full speed, while the others are employed in testing meters for soundness and for low-water line in wet meters, which latter operations will only require his personal attention at long intervals of time.

If the Metropolitan Board of Works had found it convenient to have acted on the suggestions contained in my letter to the chairman, in reference to Mr. Mills' gasholders, and any surplus ones there may possibly be in the City (were it competent for the board to do so), it would still, in my opinion, have been necessary to order an additional supply of new gasholders to be made promptly, to carry on the work efficiently; and therefore, I think, in ordering some new ones to be made, the board took a small step in the right direction, but not such a stride as to accomplish the feat that has to be performed, if the gas companies, meter makers, and gas consumers of the metropolis, as well as in the provinces, who are supplied with meters from the metropolis, are to be preserved from the very serious inconvenience which will necessarily result from any delay on the part of the Metropolitan Board of Works in carrying out the provisions of the Sale of Gas Act in a sufficiently comprehensive and prompt manner.

I merely throw out these hints for the consideration of the board at the meeting to be held on the 20th inst., and I do so with some diffidence, because I know, generally, that information supplied voluntarily is not appreciated, however valuable it may be; still, I shall have the satisfaction of feeling that, as far as my humble means and practical information are concerned, I have employed and rendered them freely and conscientiously for the benefit of all interests concerned.

103, *Southwark Bridge Road*, *Sept.* 7, 1861. WILLIAM CROSLEY.

Register of New Patents.

406.—THOMAS PEDRICK, of 8, Brighton Terrace, Brixton, London, machinist, for "*Improvements in obtaining and applying motive power by water, and in apparatus connected therewith.*" Provisional protection only obtained. Dated Feb. 19, 1861.

These improvements consist in the use of the force of water set in motion by pistons or plungers, which pistons or plungers may be acted upon by manual power or otherwise. This is effected by the use of a driving-axle connected to a beam or cross-head, whereby the pistons or plungers also connected therewith, working in two water cylinders or pumps of equal size, are duly acted upon, the said cylinders being, each of them, connected to other or working cylinders by a tube or pipe of considerably less bore than the respective areas of the cylinders. Of course, instead of four cylinders, eight or twelve, and so on, may be used, if thought expedient; the cylinders to have the necessary appliances for rendering the pumping action effective, and communicating the power obtained to the purposes required.

The above is a description of the nature of the invention, the details of which may probably be varied in practice.

427.—CHARLES MASCHWITZ the younger, of Birmingham, merchant, for "*A new or improved tap or stop-cock for liquids, steam, and gas.*" Provisional protection only obtained. Dated Feb. 21, 1861.

This invention consists of a tap or stop-cock, constructed as follows:—On the underside of the horizontal body of the tap is an opening, to which is screwed a vertical cylindrical piece, having on its axis a small cylindrical hole; and on one side of the said hole, and parallel therewith, is a nearly semi-circular passage. On the top of the said cylindrical piece is a cap or plate, fixed on an axis, which said axis passes through the small hole in the cylindrical piece. The said cap or plate has a semi-cylindrical opening of the same size as that in the cylindrical piece, and the said cap or plate may be turned so as either to make the two openings coincide, or to bring that part of the cap or plate having no opening over the opening in the cylindrical piece. The plate and the top of the cylindrical piece are made to fit accurately, and a circular rim or projection on the top of the cylindrical piece works in a corresponding groove in the cap or plate. The lower end of the axis of the cap or plate is fixed in a rotating piece, working on the lower part of the cylindrical piece. The lower part of the said rotating piece constitutes the delivery-pipe of the tap or stop-cock, and the axis of the cap or plate is fixed in a diaphragm extending across the interior of the said rotating piece. The said diaphragm is perforated with an opening of the same size and shape as that in the cap or plate, and when the said rotating piece is turned so as to bring the openings in the cap or plate, and in the cylindrical piece, and in the diaphragm of the rotating piece, into the same line, liquid can pass through the tap. When the rotating piece is turned, so as to bring the openings in the cap or plate, and in the diaphragm, opposite the solid part of the cylindrical piece, the liquid is shut off. The rotating piece is provided with thumb-plates with which to turn it, and is secured to the cylindrical piece by pins on the latter, engaging in a groove in the inside of the said rotating piece.

472.—JAMES HINKS, of Birmingham, manufacturer, for "*An improvement or improvements in glass chimneys for lamps with flat wicks.*" Patent dated Feb. 23, 1861.

This invention consists in manufacturing glass chimneys for lamps with flat wicks, as hereinafter explained. Chimneys made according to this invention are particularly applicable to lamps in which petroline, paraffine, kerosine, and other volatile hydrocarbons, are burned; and the said chimneys are also applicable to lamps in which heavy or fixed oils are employed.

In manufacturing glass chimneys, according to this invention, the lower end of the chimney, which fits in the gallery or support of the lamp-burner, is made of the ordinary cylindrical figure. Immediately above the last described part, the chimney is flattened; that is to say, its diame-

ter in one direction is diminished, so as to bring its sides in that direction parallel or nearly parallel, and its diameter at right angles to that last described is increased. There is thus formed a chamber, the sides of which are parallel, or nearly parallel to the flame on every side, and by which the air is so directed upon the flame as to induce the most perfect combustion. That part of the chimney surmounting the flattened part is cylindrical.

APPLICATIONS FOR LETTERS PATENT.

2176.—Edward Joseph Hughes, of the firm of Hughes and Sons, patent agents, 123, Chancery Lane, London, for "*An improved apparatus for collecting the gases which escape from furnaces.*" A communication. Aug. 31, 1861.

2184.—Thomas Shutt Stock, and Joseph Sharp Stock, and Henry Taylor, all of Birmingham, Warwick, manufacturers and copartners, for "*A new or improved tap or stop-cock.*" A communication. Sept. 2, 1861.

2213.—Frederick Bennett, of Upper Works, Bagillt, Flint, manager, for "*An improved method of coating the interior of lead, and lead composition pipes, with tin, or its alloys.*" Sept. 5, 1861.

2221.—John Reid, of Leith, Mid-Lothian, N.B., gas engineer, for "*Improvements in the treatment of gas, and the apparatus employed therein, with a view to its more accurate measurement in wet gas-meters.*" Sept. 5, 1861.

GRANTS OF PROVISIONAL PROTECTION.

1909.—Benjamin Browne, of 52, King William Street, London, patent agent and civil engineer, for "*An improved self-acting tap or apparatus for the convenient passage of lighting gas, or other illuminating fluid or liquid, and particularly adapted for lighting cigars.*" A communication." Aug. 1, 1861.

2000.—Hugh Greaves, of 22, Abingdon Street, Westminster, Middlesex, civil engineer, for "*Improvements in apparatus to be employed for the water conveyance and delivery of coals, and other materials.*" Aug. 12, 1861.

2020.—François Durand, of Paris, France, tube-manufacturer, for "*Improvements in the manufacture of metallic tubes.*" Aug. 14, 1861.

2024.—Edmund Edwards, of 13, Beaufort Buildings, Strand, London, for "*Improvements in machinery or apparatus for separating mineral ores, coal, and other substances, from impurities.*" Aug. 14, 1861.

2055.—John Robb, Aberdeen, N.B., merchant, for "*Improvements in ventilating.*" Aug. 19, 1861.

2056.—George Thomas Selby, of Smethwick, Stafford, manufacturer, for "*An improvement in furnace condensers.*" Aug. 19, 1861.

2071.—John Somerville, of Maidstone, Kent, gas engineer, for "*Improvements in apparatus for drilling and tapping gas and water-mains and pipes, and in preventing leakage therefrom.*" Aug. 20, 1861.

2075.—Frederick Gye, of the Royal Italian Opera, Covent Garden, for "*Improvements in constructing gasometers and gasometer tanks.*" Aug. 20, 1861.

NOTICES TO PROCEED.

1581.—William James Harris, of Liverpool, for "*Improvements in dry gas-meters.*" A communication. June 19, 1861.

1726.—Alfred Noble, Bristol, analytical chemist, for "*Improvements in obtaining products from alkali waste and gas-lime refuse.*" July 6, 1861.

Miscellaneous News.

RATCLIFF GAS COMPANY.

The Ordinary Half-Yearly General Meeting of the Proprietors of this Company was held on Friday, the 30th ult., at the Company's Offices, New Crane, Wapping—Samuel Foulger, Esq., in the chair.

The notice convening the meeting having been read, and the company's seal affixed to the register of shareholders,

The Secretary (Mr. H. J. Baddeley) read the following directors report and financial statement:—

Dr. *Trade Account for the Six Months ending June 30, 1861.* *Cr.*

To Directors allowances	£275	0	0	By Gas rental	£13,890	13	6
Salary of secretary and clerks	300	0	0	Rental of meters	6	1	0
Collectors commission and pay	159	17	0	Coke	3,021	14	4
Rent, rates, and taxes of offices	50	0	0	Breeze	92	2	3
Stationery, printing, and general charges	368	8	6	Tar	369	17	3
Payment to auditors	10	0	0	Ammoniacal liquor	99	13	3
Coals, including carriage, &c.	7,882	10	11				
Purifying materials	275	18	10				
Supervision and labour	2,600	2	2				
Tools and other implements	122	7	10				
Ordinary repair and maintenance of premises	542	16	8				
Rents, rates, and taxes of manufactory	493	10	10				
Distribution—Ordinary repair and maintenance	581	0	3				
Meters—Restoring and replacing	15	19	6				
Law and parliamentary charges	398	8	0				
Interest on loans	400	19	5				
Bad debts, overcharges, and allowances	130	6	3				
Net profit	2,932	15	5				
	£17,480	1	7		£17,480	1	7

The directors have much satisfaction in submitting to the shareholders the result of their operations for the half year ending the 30th day of June last.

The long-continued severity of the weather in the early part of this year occasioned great anxiety in the management of your affairs; and, notwithstanding the increased cost of coal consequent thereon, and the subsequent depression of trade—which, your executive regret to say, still prevails—the audited accounts show a net profit of £2932. 15s. 5d.

The proprietors will observe, in the accounts now about to be presented, that an alteration has been made in the mode of stating the trade account, in order that the items may correspond more closely with the return required by the Secretary of State for the Home Department; and the directors avail themselves of such alteration, because it does not diminish the information they have always rendered with pleasure to their shareholders.

Your directors are gratified in being able to report that the manufacturing and gasholder stations are in good working order, and the company's district efficiently lighted with gas; but your directors, having within the last few years expended many thousand pounds in the enlargement of your works, the erection of new coal-stores, the extension of retort-houses, gasholders, &c., and in increasing the size of mains whenever an opportunity presented itself, without making any call upon the shareholders, deem it their duty no longer to abstain from doing so, and hereby give notice, that it is their intention to propose a call of £2 per share, payable on the first day of November next.

The directors, in conclusion, recommend that a dividend for the half year ending June 30, 1861, upon the paid-up capital of the company, after the rate of £6. 17s. 6d. per centum per annum, or 11s. per share (free of income-tax), be now declared, payable by warrant, on and after the 2nd day of September next.

The Chairman, in opening the business of the meeting, expressed his regret at the absence of Mr. Hammack, the chairman of the company, owing to that gentleman's indisposition. However, called upon unexpectedly to preside over the meeting, he had endeavoured to make himself acquainted with the facts which it would be necessary to bring before the notice of the proprietors; and it was matter of satisfaction to him, to find that no peculiar circumstances had occurred during the half year calling for special remark. There was an item in the accounts of £398. 8s. for law and parliamentary charges, which it was, perhaps, necessary to refer to. That sum covered a period of six or seven years; and the reason of its not appearing in the accounts before, was owing to the fact, that frequent applications had been made to the solicitors, to furnish their account, which, however, they had neglected to do. It was, also, right to state, that about £100 was attributable to proceedings in Parliament, which resulted in the districting arrangements. Another subject which required notice, was the proposed call of £2 per share. This was a step which their chairman, Mr. Hammack, cordially approved of. The company were paying a large amount of money for interest on loans, and the board thought that money might as well be put into the pockets of the shareholders. The directors had had the matter under consideration on many occasions, but had forborne to bring it before the proprietors, till they were sure that, with an increased capital, they should be able to pay the same amount of dividend as before; and they were now in such a position, that he thought they might almost guarantee a dividend to the same amount. He would move the adoption of the report and accounts.

Mr. Baddeley (a director) seconded the motion, and said, with reference to the solicitors bill, which the chairman had referred to, he ought to tell the proprietors that, being a retired lawyer, the account was referred to him, and he had no hesitation in saying, that a more honest bill was never delivered.

Mr. Pitt said, the only observation he had to make upon that subject was, to ask why the present shareholders should be paying the debts of others, who had gone out of the concern?

The Chairman said, the account had been asked for, over and over again.

The Secretary stated that there was always a sufficient amount of undivided balance to cover any such item as that now referred to.

Mr. Whittington expressed his approval of the proposed call of £2 per share, because he considered it would put the company in a more satisfactory state.

Mr. Walmisley called attention to the fact, that whilst, a short time ago, the bad debts of the company during the half year only amounted to about £50, they were now between £100 and £200.

The Chairman explained that it was owing to the Act of Parliament, which obliged the company to supply everybody who applied, almost without exception.

The Secretary stated, that the bad debts for the corresponding period of 1859, were £117.

Mr. Pitt inquired, what amount would be raised by a call of £2 per share?

The Chairman replied, about £10,000.

The motion for the adoption of the report was then put, and carried unanimously.

Mr. Taylor moved a resolution, authorizing the payment of a dividend of 11s. per share, being at the rate of £6. 17s. 6d. per annum, free of income-tax.

Mr. Whittington seconded the motion, which passed *nem. dis.*

Mr. Baddeley moved the payment of a call of £2 per share, payable on or before the 1st of November next.

The motion, having been seconded by Mr. Wilson, was unanimously carried.

Mr. Boggon moved a vote of thanks to the directors, for their able and judicious management during the past half year.

Mr. Whittington seconded the motion, which passed unanimously.

The Chairman suitably acknowledged the vote, on behalf of the board.

Mr. Nutter moved a vote of thanks to the secretary, for the efficient manner in which he had conducted the business of the company during the past half year.

Mr. Pitt seconded the motion. There could not, he was sure, be two opinions as to the efficiency which the secretary had brought to bear upon the affairs of the company; and he was sure the secretary deserved all the confidence which had been placed in him.

The Chairman, in putting the motion, said the directors could endorse every word which had been said of their secretary.

The motion was unanimously carried.

The Secretary, in acknowledging the compliment, said, when he undertook the responsibilities of his office, succeeding, as he did, their late worthy and much-esteemed secretary, he did so with a determination to do his duty; and, if the proprietors were satisfied with what he had done, it was the highest reward that he could hope for.

Upon the motion of Mr. Whittington, a vote of thanks was unanimously passed to the auditors.

A vote of thanks was also passed to the chairman (Mr. Foulger), coupling with it a vote of sympathy with Mr. Hammack, the chairman of the company; and it was cordially resolved, that the secretary be requested to communicate to the chairman the sympathy felt by the proprietors with him in his indisposition.

The meeting then separated.

SALE OF GAS ACT.

I.—RETURN of the EXPENSES incurred under the Authority of the Treasury, up to the 30th Day of June last, in carrying into Effect the Act for Regulating Measures used in the Sales of Gas, 22 & 23 Vict., c. 66.

DEPARTMENT OF COMPTROLLER-GENERAL OF THE EXCHEQUER.

Mr. W. G. Tomkins, temporarily employed on the opening of the Gas Measuring Department in the Exchequer, to direct and assist in the use and management of the standard gas-measuring instruments, as notified by the Treasury letter, dated the 2nd of February, 1861. Mr. Tomkins is still retained, with a view to the verification of the metropolitan gasholders, ordered to be prepared by the Treasury, and which have not yet been completed by B. Donkin and Co. From the 7th of February, 1861, to the 30th of June, 122 days, at one and a half guinea per day	£	192	14 0
Incidental expenses, incurred by W. G. Tomkins in providing india-rubber tubing, soldering-irons, and metal for sealing, blow-pipe, &c., &c.		22	6 7
David Porter, mechanic, for cleaning and looking after the instruments, from the 18th of March to the 30th of June, 1861, 15 weeks, at £1. 10s. per week		22	10 0
Total	£	237	10 7

This amount only includes the extra expense incurred in this office for the measurement of gas at the Exchequer.

Exchequer-office, August 2, 1861. MONTEAGLE, Comptroller-General.

DEPARTMENT OF WORKS AND PUBLIC BUILDINGS.

Cost of forming a room at the Exchequer-office, Old Palace Yard, for the reception of gas-measurers; for laying on gas and water-services to the same, and other necessary works.	£	471	15 6
Cost of window-blinds, floor-coverings, and other articles of furniture		37	8 11
Total expense by the Board of Works	£	509	4 5

EXPENSES UNDER THE DIRECTION OF PROFESSOR AIRY.

By Treasury order, dated the 24th of February, 1860, accounts amounting to £225. 2s., viz.:—

The Liverpool United Gaslight Company, for standard transferrer	£	19	1 0
W. Crosley, for three transferrers for the metropolitan cities		37	16 0
E. W. Ladd and Co., for standard cubic foot measure, three copies of the same, various auxiliary apparatus, and personal attendance		114	6 0
L. Oertling, for standard weight of 62·321 pounds, and three copies of the same		48	0 0
Professor W. H. Miller, of Cambridge, for travelling expenses and remuneration for his time employed in verifying the standard weight and standard cubic foot		4	19 0
G. B. Airy, petty expenses		1	0 0
Total	£	225	2 0

By Treasury order, dated the 20th of February, 1861, accounts amounting to £146. 11s. 2d., viz.:—

P. Adie, for apparatus, principally optical	£	17	12 0
De Grave, Short, and Fanner, scale-beam and weights		2	4 6
Huxley and Ching, for gas-stove		25	0 8
Murray, for cloth coverings for the gas-measurers		27	0 0
Negretti and Zambra, for thermometers and apparatus		55	11 6
Troughton and Simms, principally for dividing and engraving the scales on the bells of the gas-measurers		19	2 6
Total	£	146	11 2

By Treasury order, on or about the 16th of March, 1861:—

B. Donkin and Co., for entirely constructing and mounting three gas-measurers at the Exchequer, and for partially constructing nine gas-measurers for the metropolitan cities	£	2068	19 4

By Treasury order, dated the 3rd of June, 1861:—

George Glover, remuneration for his services in superintending the construction of the gas-measurers	£	471	0 3

Collection of Sums.

24th of February, 1860	£	225	2 0
20th of February, 1861		146	11 2
16th of March, 1861		2068	19 4
3rd of June, 1861		471	0 3
Total	£	2911	12 9

Royal Observatory, Greenwich, August 2, 1861. G. B. AIRY.

TOTALS BROUGHT DOWN.

Expense incurred by the Comptroller-General, Exchequer	£	237	10 7
Ditto by Board of Works		509	4 5
Ditto by Professor Airy		2911	12 9
Grand total	£	3658	7 9

Whitehall Treasury Chambers, August 5, 1861. F. PEEL.

II.—RETURN of the Number of Copies of the STANDARD INSTRUMENTS stamped by the Exchequer, under the Sale of Gas Act, 22 & 23 Vict., c. 66, up to the 30th Day of June last, with the Names of the Municipal or other Authorities to whom such Instruments respectively belong.

Description of Instrument.	Date of Verification.	Authorities to whom such Instruments belong.
10-feet gasholder	16th of April, 1861	The City of London.
10-feet gasholder	22nd "	The borough of Sheffield.
10-feet gasholder	24th "	The city of Aberdeen.
Cubic-foot transferrer	25th "	The borough of Liverpool.
5-feet gasholder	27th "	The borough of Lancaster.
Cubic-foot transferrer	27th "	The borough of Sheffield.
Cubic-foot bottle (measure)	27th "	Ditto.
Cubic-foot transferrer	27th "	The city of Bath.
10-feet gasholder	30th "	The City of London.
10-feet gasholder	3rd of May, 1861	The city of Bristol.
10-feet gasholder	7th "	The borough of Ashton-under-Lyne.
Cubic-foot bottle	7th "	The city of Bath.
5-feet gasholder	11th "	The city of Aberdeen.
10-feet gasholder	13th "	The City of London.
5-feet gasholder	17th "	The city of Bristol.
Weight, 62·321 pounds.	21st "	The borough of Sheffield.
10-feet gasholder	24th "	The borough of Wakefield.
10-feet gasholder	25th "	The City of London.
10-feet gasholder	3rd of June, 1861	Ditto.
10-feet gasholder	6th "	The borough of Carlisle.
10-feet gasholder	24th "	The City of London.
10-feet gasholder	25th "	Ditto.

Exchequer-office, August 2, 1861. MONTEAGLE, Comptroller-General.

METROPOLIS GAS SUPPLY.

DR. ALDIS'S REPORTS ON THE GAS SUPPLIED IN ST. GEORGE'S, HANOVER SQUARE.

QUARTER ENDING MARCH 30, 1861.

Dr. Aldis having been appointed by the vestry gas examiner under the Metropolis Gas Act, 1860, on February 21, 1861, was ordered to report monthly. He had, therefore six gases to test, instead of one, as formerly, and performed the experiments in the rooms provided by the Chartered Company, at No. 4, Cannon Row, Westminster; by the London, at No. 73, Bessborough Street; and by the Equitable, at No. 78, Cambridge Street. Each room contained a photometer, with other necessary apparatus, for taking the illuminating power of the gas.

The result of the sulphur determinations, mentioned in a report to the vestry, dated Feb. 21, 1861, is, that a quantitative analysis for sulphur in the cannel gas supplied by the London Company, on Jan. 14, 15, and 17, produced 16·51, 17·54, and 5·2 grains respectively, in 100 cubic feet, the Act allowing 20 grains of sulphur. But, it must be remembered that sulphur, in the form of sulphuretted hydrogen, produces a much more deleterious effect than that of the bisulphide of carbon. This is the first time that sulphuretted hydrogen had been detected, and its presence was attributed to an accident.

During March, 35 observations were made on the illuminating power and quality of the gas supplied by the preceding companies.

The cannel-gas was burned in a bat's-wing burner, at the rate of 5 cubic feet an hour; while the common gas was consumed in an argand burner, at the same rate, with a 7-inch chimney, according to the Act.

The monthly average light in sperm candles was above that required by the Metropolis Gas Act, as will be seen by the following table:—

	Chartered.	London.	Equitable.
Cannel	27·54	22·7	22·9
Common	13·62	14·57	15·36

With respect to the purity, all the gases were free from sulphuretted hydrogen; and those supplied by the Chartered and Equitable Companies were so far free from ammonia, that they did not discolour turmeric paper, but the common gas from the London Company presented traces of it.

A table was annexed to the report, containing the number of examinations on which it was founded, with the maximum, minimum, weekly, and monthly average illuminating power, and the dates of the experiments.

QUARTER ENDING JUNE 29, 1861.

One hundred and thirty-two observations were made during the quarter upon the gases supplied by the Chartered, London, and Equitable Companies, at the works in Horseferry Road, 73, Bessborough Street, and 78, Cambridge Street, respectively.

The apparatus provided by the Chartered Company having been so much damaged, in consequence of a fire in Cannon Row, Westminster, the gas was tested at the works.

The cannel-gas was burned in a bat's-wing burner, at the rate of 5 cubic feet an hour, while the common gas was consumed in an argand burner, at the same rate, with a 7-inch chimney, in accordance with the Metropolis Gas Act, 1860.

The following table gives the average light, in sperm candles, of all the gases, which were free from sulphuretted hydrogen; and so far free from ammonia, that they did not discolour turmeric paper, excepting the common gas from the London Company, which presented traces of it:—

	Chartered.	London.	Equitable.
Cannel	24·80	25·34	24
Common	14·10	15·05	15·64

A table and summary were sent with each monthly report on the gas to the vestry, containing the number of examinations, with the dates, and the maximum and minimum light, with the weekly and monthly average illuminating power.

Naphthalized Gas.

I also reported upon the subject of a letter dated April 24, 1861, from the United Kingdom Carburating Gas Company, which directed your attention to a patented invention for carburating gas for street lamps, and for lighting public and private buildings, whereby at a very small cost a considerable saving is effected.

I made the experiments during three weeks upon the increase of illuminating power of the naphthalized gas, and the quantity of material consumed.

The process consists in passing common gas through a chamber containing naphtha, with which the gas, having come into contact, mechanically combines with the volatile vapours and produces a greatly increased light.

This method is termed naphthalizing gas, for which a patent was taken out by Professor Donovan, on the 6th of October, 1830, who applied naphtha to hydrogen, carbonic oxide, and the gases produced by decomposing water by coke.

Mr. George Lowe received a patent, June 9, 1832, which has expired, for naphthalizing coal-gas, and French patents have been taken out for the same purpose.

But the principle of applying naphtha to street lamps, and the mode adopted by the company, is new in this country.

The company intend to apply the carburator inside the lantern, below the burner, in order to keep an equable temperature.

In one experiment, the illuminating power of the common gas, when naphthalized, was nearly double, and in another, it became two and a quarter times greater than the non-carburetted.

During a series of experiments on the quantity of naphtha consumed, I found that it varied considerably, but the average amounted to 10·9 grains per cubic foot of gas.

Assuming, then, 11 grains of naphtha to be consumed per foot, the quantity burnt annually would be rather more than two gallons, at 3s. a gallon.

The apparatus is applicable to street lamps, and the preceding experiments show that the brilliancy of inferior gas is increased, and the consumption economized, by the addition of naphtha.

In St. George's parish, the question of cost must be compared with cannel, and not with common gas, the parish lamps being supplied with the former.

I could not, on that account, and for other reasons mentioned in the report, recommend the vestry to make any alteration.

(Signed) C. J. B. Aldis, M.D.

THE GAS QUESTION IN READING.

Some allusion was made in the Journal of the 13th ult. to a controversy which had arisen between the Local Board of Reading and the two gas companies of that town, relative to the price of public lights. The following are copies of the reports made by Mr. Spice to the joint committee of the two gas companies on the conditions of the contract prepared by the local board, to which the assent of the companies was required, and on the general questions at issue; which documents have sufficient interest to warrant their reproduction, *in extenso*, in our columns.

OBJECTIONS TO CLAUSES IN SPECIFICATION PREPARED FOR THE READING LOCAL BOARD OF HEALTH.

Clause 4.—Local board to supply *burners;*

Clause 6.—Local board to light and extinguish lamps.

These two clauses may be taken together, and can only be regarded as being very absurd in character. A burner, when first used, may be of the right size, and in proper order for consuming, under a given pressure, the stipulated quantity of gas, but in a very short time may require "opening," to allow the same quantity of gas to be consumed; and, if "opened" as public lamp-burners are by lamplighters, with pieces of watch-spring—or, perchance, by a pocket-knife—a much larger quantity would pass through the orifice unless checked by the stopcock, in the use of which the lamplighter's judgment is regulated by varying circumstances, and experience in his particular district. Under this specification it is proposed to bind the contractors, under heavy penalties, to consume by these burners certain quantities of gas, not in the gross in so many months, but in and by each and every lamp, hour by hour, night after night, for eight months and twelve months, as the case may be, in two classes; and to withhold from the said contractors the power of controlling the only means by which alone the result might be approximately effected.

Clause 9, requiring a certain quantity of gas to be consumed by each burner in each of the three classes up to midnight, in each and every night, and a certain smaller, and even fractional, quantity after midnight,

May be described as a perfect *gem* amongst curiosities of its class, and, but for its very newness, might be consigned to an "Old Curiosity Shop."

Who that knows anything of public gas lighting does not know that it is *impossible* to obtain perfect uniformity as to quantity of gas consumed by the burners of any given number of public lamps, and that the given quantity will only and *can only* be consumed on an average of the whole?

Clause 10 provides for a penalty of 3d. per lamp per hour for every lamp not supplied with gas in accordance with the specification.

The modesty of this demand is certainly not extreme, as will be seen when it is explained that it amounts to about *thirteen times* the sum proposed to be charged for the light, being at the rate of nearly £40 per lamp per annum.

Clause 11 provides for the contractors being judged and sentenced as to fines by any of the numerous police constables or any of the officers of the local (and I wish I could add liberal) board of health of the Borough of Reading.

And these constable and officers of health are all presumed to be unquestionably competent to determine, by a mere peep out of any corner of any one of their numerous eyes, whether any one or any number of the burners provided by the local board and lighted and regulated by officers of the said local board, (the light-giving *material only* being supplied by the contractors) are consuming the exact quantity to a fraction as prescribed by the specification! I can scarcely think these officers and men will take offence at being considered by me as being incompetent for the discharge of such duties, however much they may value the implied compliment to their varied talents contained in this clause of the specification.

The only proviso with which this clause is clogged is, that a copy of the certificate of the constable or officer fixing the fine or penalty, shall be left at the contractor's office within three days after the time of default, or, in other words that *three* days may elapse before the contractors are *made aware* of the default, so that their chances of disproving it may be diminished by the lapse of that period of time.

Clause 12 provides in a very insufficient manner for exemptions from penalties, confining such exempting causes to "tempest, frost, fire, and floods,"

Leaving out entirely the most common cause of public lamps being extinguished—that is, a *gale of wind;* whereas, if the words of the 24th section of the Metropolis Gas Act, 1860, had been adopted, *all* "unavoidable accidents" from *any* cause would have been included. I can only infer that the liberality of Parliament is too liberal for the local board of health of the Borough of Reading, or for their advisers in this matter. But to escape any penalty which may in error be certified at the expiration of *three* days to be due, the contractors must give notice of claim within *one* day. Query, is this evenhanded justice?

Clause 13 provides for the illuminating power being equal to 12 sperm candles, *anywhere* within the district lighted.

This is a departure from the provision, under this head, of the Act which has been made to supply materials for the concoction of this specification—namely, the Metropolis Gas Act, 1860"—which provides for the *metropolis* 12-candle gas, but limits the testing to 1000 yards from the works, the illuminating power being subject to reduction by the deposit in cold pipes of *the best* of the light-giving properties of the gas; but, altogether independently of limitation of distance from the works for the application of the test, I object to the standard of 12 candles for Reading as the minimum, and, considering the position of Reading in relation to the coal-fields, I say 10 candles would be a fair standard, because, to keep clear of fines for quality, 12-candle gas must as a rule be made and supplied.

Clause 14 provides for penalties for want of illuminating power;

And, again, copying from the same Act of Parliament, section 26, most unfairly leaves out a very important clause, which provides that no conviction shall take place under this section if it shall be proved that the defect "was occasioned by any unavoidable cause or accident."

Clause 15 provides that the local board may, if they think fit, appoint a chemical examiner, or gas engineer, or other competent person, for the purpose of testing the illuminating power, purity, pressure, and consumption of the gas supplied.

Now, the Act before referred to, which has been very largely drawn upon for materials wherewith to build this laughably curious superstructure, called a "Specification of Particulars," &c., provides, in section 27, that "every local authority taking a supply of gas according to this Act, SHALL provide all sufficient apparatus, machinery, and instruments, for testing the illuminating power and purity of the gas; and, from time to time, SHALL appoint, and out of any funds applicable by them for their local purposes may pay a chemical examiner, or gas engineer, or other competent person, to be an examiner for the purposes of this Act," &c.; and I submit that, if the local board of health of the Borough of Reading seek, as they have done, to avail themselves of such of the provisions of the Act as they have, by their agents, cunningly incorporated in their specification, they should, in fairness, accept the obligation imposed, of appointing and paying a properly-qualified officer, whose duty alone it should be to determine on their behalf questions which would arise in carrying out a contract under the provisions of a document which is absurdly strict in its details, and not seek to leave such questions to the determination of their own unqualified officers, or the policemen of the borough.

Before leaving clause 15, I would call attention to the fact that, among the duties of the imaginary chemical examiner or gas engineer (who may, by-the-bye, be the celebrated "Man in the Moon," is the "testing the pressure;" but, unfortunately, there is no amount or standard of pressure stated in the specification. The only pressure discoverable in it is that which is brought to bear on the gas companies, which is without limit, and unmeasurable.

Clause 16 relates to the removal of lamps, and requires the contractor to bear the greater part of the expense.

This is not only unreasonable, but unusual; the usual course being, in accordance with common sense, that the party requiring the alteration should pay for it.

Clause 17 provides that no regulator shall be fixed to any lamp, unless it has first been approved by the local board.

The sense and justice of this—or, rather, the entire absence of both these qualities—in this provision, may be shown thus:—

The quantity of gas agreed upon may be consumed, and some 30, or 40, or 50 per cent., may be, in many lamps, consumed in excess of such quantity, but the gas companies shall not, without the consent of the local board, use an instrument or apparatus to prevent this excessive consumption. In other words, they are not to have the control of their own property, which may thus be wasted or not, as the local board or their officers may think fit.

Clause 21 provides for the use of meters, to be attached to not less than one in every twenty lamps; and

Clauses 22 and 23 provide for the quantity of gas consumed being determined by the average results of the working of the meters.

This mode of determining the quantity consumed is very objectionable, inasmuch as the lamps to which meters are applied, may, if under the control of the party receiving the supply, be more carefully dealt with than they otherwise would be; and, if under the control of the party supplying the gas, they might be allowed to consume a greater quantity to *assist* the average result.

The only fair and satisfactory way of applying meters to public lamps is to have a meter for each lamp.

Clause 24 provides for the deduction from the contract price of the value of any quantity of gas, which, by the doctrine of average, may be made to appear has been consumed short of the estimated quantity in each case, and provides, also, that for any quantity which may by the same means be shown to have been consumed in excess of the estimated quantity, *no payment shall be made.*

"Fair play" is said to be a "jewel;" what sort of play is provided for in this clause. I should think any policeman in the Borough of Reading could tell. I cannot think that any one of them, nor even any officer of the Local Board *save one* would call it "fair play."

Clause 26 provides, with admirable consistency, that for the privilege of ascertaining, by the ingenious method set forth in clauses 21, 22 and 23, whether more or less than the estimated quantity of gas is consumed, the gas companies are to pay one-half the entire cost of the meters, and expenses attending the use of them;

And, when it is borne in mind that, by clause 24, it is provided that *all* the benefit, if any, which may accrue from the use of meters, shall be *for the sole advantage of the Local Board*, another word need not be said to convince the most unprejudiced, that if this precious document put forth by the Reading Local Board of Health as a perfectly fair and proper specification be, as has been intimated by Mr. Rogers, a model specification, it is a model which all honest, fair-dealing, and right-minded men would instinctively avoid copying.

It is, in short, a disgrace to those who prepared it, and to those who in their simplicity have been deluded into the adoption of it.

(Signed) R. P. Spice.

County Chambers, Cornhill, London, 21st of August, 1861.

REPORT.

Gentlemen—Having already furnished you with a statement of my objections to the specification submitted to you by the local board of health for your borough, I now respectfully address to you the following observations upon some of the extraordinary statements made at the meeting of the board on the 25th of last month, as reported in the *Reading Mercury* of the 27th ult.

Passing over the preliminary statement made or read by the clerk, I observe that a sub-committee of the board met a deputation from each gas company, and at the meeting a copy of a resolution was handed in, stating in effect that the directors of the gas companies, after having given the subject the fullest consideration, had concluded that the price at which they had offered to light the public lamps was the very lowest they could accept, having due and proper regard to the private consumers on the one hand, and the interests of the shareholders on the other.

I have no hesitation in endorsing this as the true and proper course to take—the only course, indeed, which, as rational men of business, you could take. You were desirous of acting in the matter with the greatest liberality, and of exhibiting an unselfish spirit, and from careful attention to the subject, had gone in the decision of the matter as far in this direction as you dare; but, by handing in the resolution announcing this fact, you are stated to have "defeated the object of the "conference."

Hence, it can only be inferred that the object of the conference was not merely to get the supply of gas at as low a price as could fairly be afforded, but at a lower rate even than that.

Or, if it be objected that the object of the conference was not as I have now stated it, but to argue the subject with the deputation, and that this was cut short by the declaration of one of the members, and so it was defeated, it comes to this—that the sub-committee possessed, or thought they possessed, more correct knowledge of the business of gas manufacture and supply than did the gas directors, whose proper business it was; thus furnishing a proof that the habit which some people have of affecting to know their neighbour's business better than their own, sticks to some of the members of the local board of health of the borough of Reading.

The question of arbitration comes next under discussion, and the proposition to submit to this mode of settling the dispute comes liberally and honourably from the side of the gas companies, and is at once snubbed. Now, what is the plain English of what passed on this point?

Why this! The party complained of—and not only complained of, but held up to scorn, contempt, and derision, as men guilty of *overcharging, using false measures*, and not really knowing their own business—this corrupt party, in answer to all charges, say, in effect, we have no wish to charge more than is right, and we now are willing to go as far as we dare go in reducing still further the price paid us under the existing contract, and, in a spirit of liberality, we have stated terms for a new contract; but, if you are not satisfied, we will leave the matter to be settled between us by a reference to indifferent persons. By men of common understanding, such a course as this is usually deemed *fair*; but, at Reading, it is thought the reverse, and interpreted into a desire to keep back the light of day. Well, for the

present, we will pass by this cause for rejecting the offer of reference, and deal, by-and-bye, with the great light shed on the subject by Mr. Simonds.

I have only to remark that, although it cannot be denied that the offer on your part was liberal and honourable, it was not, in my opinion, called for or advisable; you had made an offer of a very liberal character, and upon this you could and should have taken your stand, with that proper amount of dignity and self-respect which should always be inspired in men's minds by an inward consciousness of having *done right*. There was not then, nor is there now, any reason why you should fear the false charges, or the frowns, or calumnies of some of your ill-advised and impetuous neighbours; nor is there the slightest reason why you should surrender the right of private judgment in the matter, which you would do by allowing any indifferent person, who might be the umpire under the reference, to determine the price which you should be paid for the article which you supply.

I could not advise you to place yourselves in such a position as to lead to the inference that you are incapable of determining at what price you can afford to sell the article you manufacture, which would be the only inference to be drawn, unless there was a just pretence for the statement that you wanted an *excessive price;* and you know, and your opponents know, that there is not the shadow of a pretence for such an imputation.

And now I will turn to the speech of Mr. Simonds, who, after a few preliminary remarks as to the past, clears the ground by declaring his preference for considering "the whole matter from first principles"—that is, by considering at what price gas could be made at Reading, and at what price it could be sold, so as to allow those who supplied it a fair dividend.

Very fair, indeed. I find no fault with the start; it is all that can be desired; but let us see how the race was run:—

First of all, let us consider the terms "first principles."

It is strange how variously the word "principle" is understood, and, when correctly understood, how often a course commenced on a stated principle is departed from.

In this case, a fixed principle of action is laid down, and immediately departed from, or disregarded entirely.

The first question involved in the course marked out by Mr. Simonds is, "What is the cost of gas when made at Reading?" and no attempt is made to answer it; instead of showing the cost of gas, and how it is made up, item by item, he asserts, first, "that the cost of coals has little or *nothing* to do with the cost of gas." Well, let us see:—

The Imperial Gas Company stated in evidence before a parliamentary committee last year that, in 1855, their coals cost, on an average of the whole year, 18s. per ton, and the residual products yielded 7s. 6d. per ton, leaving the net cost for coals 10s. 6d. per ton; and, in 1857, their coals cost 18s. 3½d., and the products yielded 5s. 3d. per ton, the net cost of coals being 13s. 0½d., increasing the cost of gas, for *coals only* 3½d. per 1000 cubic feet. But I can put a stronger case than this, which, being an extreme case, will show the matter in a clearer light. At a gas-work in Middlesex, *within a mile of the Thames*, coals delivered into the works cost, at one period, 18s. per ton, and the products yielded 8s. per ton. At another period, during a severe frost, coals cost £1. 11s. 6d. per ton, products yielding 12s. per ton, and under the latter state of circumstances gas, at the same works, cost 1s. per 1000 feet more than under the former, for *coals only;* so that to say "the cost of coals has little or nothing to do with the cost of gas," is clearly worse than mere twaddle, for it is opposed to truth.

What would Mr. Simonds say if he were told that the cost of beer did not in any way, or to a very small extent, depend on the cost of malt?

Do great brewers, such as Mr. Simonds, make large fortunes when malt is dear, or when it is cheap? *Echo* answers, *cheap*, and echoes generally answer correctly.

But notwithstanding that the cost of coals is stated by Mr. Simonds to be of no importance in the account, we are favoured with some statements both as to their cost and what gas they yield; the price is put at 18s., and the yield from 7000 to 13,000 feet of gas per ton, 7000 being good gas, and 13,000 being bad.

Certainly, if only 7000 feet of gas be taken from a ton of gas coals, the quality of such gas should be good, but as such coals do not *contain* more than about 9300 feet of gas, it is clear that 13,000 could not be taken out of them.

The quantity of beer which can be made from a quarter of malt depends, I believe, on the quantity of "liquor" used in the operation; not so, however, with regard to gas; the poor gas-maker can only get out that which he finds within, and the large quantity which Mr. Simonds had been taught can be extracted from a ton of coals, can only be obtained from a kind of coal called "Boghead cannel," which would cost at Reading about 60s. per ton; and the gas, instead of being poorer than the 7000 feet, would be nearly three times greater in its illuminating power.

I have heard occasionally of boys being taken from school because they know more than their masters—surely, this must have been the case with Mr. Simonds; his master never could have taught him all the depth of all the mysteries with which he appears to be so profoundly familiar.

Now, for the next assertion, that in an inquiry which had taken place in London, it was stated by the Gas Companies themselves, that gas could be produced there for 10d. a thousand, and this has gone forth to the public as truth, *the cost of gas in London* 10d. *for* 1000 *feet!* Mr. Simonds has never seen such evidence for the simple reason that *it never was given*.

Next we are told, that one of the London companies had contracted with one of their workmen to make gas for them at 1s. 3d.

Really, I begin to wonder whether Mr. Simonds has been hoaxed, instead of having been correctly "posted up," for this discussion.

The simple reply to this assertion is,

1st. That the contract to which Mr. Simonds refers was not made at 1s. 3d., but at 1s. 9d., per 1000 feet, delivered at the consumer's meter.

2nd. That it was not made with one of the companies' *workmen*, for workmen are not found in gas-works with capital to the tune of £20,000 or more, which this contract required.

3rd. That the contract was proved to have resulted, not in a profit to the contractor as Mr. Simonds states, but in a very great loss, and that at the end, besides paying 1s. 9d. per 1000 feet, the company had to pay the contractor *many thousands of pounds* by half-yearly instalments, on account of improved quality and a variety of contingent circumstances arising out of the performance of the contract.

4th. That the company did not put an end to it because they thought they were paying too much, as Mr. Simonds says they did, but entered into another contract *at the same price*, with another contractor, who, with his partner, not long afterwards, took refuge in the Bankruptcy Court.

And, lastly, this company have since then made gas on their own account, and, as a consequence, have paid less dividends, and are reported to be about to raise the price to their consumers, not finding 4s. a paying price, even in the thickly-populated *City* of London.

Now then, however, for a comparison, to which you are challenged with London; you are asked to account for the difference between the cost of 1s. 3d., and the price charged at Reading. First of all, let us correct the stated, but false, price of 1s. 3d., to 1s. 9d., the price really paid. Now, when this London company paid only 1s. 9d. for their gas, they sold it at 4s., and required the difference between the two sums—namely, 2s. 3d.—to pay a dividend of 8 per cent.; but the 1s. 9d. did not pay their contractor—on the contrary, it left a serious loss. The *cost*, therefore, may fairly be assumed to be 2s. at their works; and the cost at your works would certainly be not less than 6d. per 1000 feet in excess of what it can be made at these large London works, with a railway into the retort-house, and numerous other advantages which you have not; 2s. 6d. may, therefore, be put down as the cost of your gas, and, as 5s. is substantially your price to the private consumer, while you get much less for the supply of the public lamps than the London companies do, you have only at the *most*, and probably less, 2s. 6d. for 1000 feet, to apply to dividend, which is only 3d. more than this great London company, with all their advantages, required; and, let it be remembered, you are set down as *antiquated, leaky*, and *defective* in every way—while, on the contrary, the London company in question is the most recent creation of modern genius.

Again, it may be answered, the charge in London—that is, the metropolis generally—is 4s. 6d., and the charge at Reading 5s., being only the difference of 6d., which is the difference in the cost of manufacture.

Next in order comes the subject of *leakage*, which is put down, perhaps correctly, and certainly not unfairly, at 15 per cent.—and this is declared upon *authority* as being criminal!

If this be so, I wonder how it is that some of the London companies have not long ere this had to stand at the bar of the Central Criminal Court.

Well, we will let this pass without a reply, only I confess I should like to know on whose *authority* this leakage of 15 per cent. is declared to be "criminal;" a crime, to lose gas by leakage, which it is the study, aim, and effort of every gas company to reduce by every means in their power! What next?

And now again, in the face of a declared preference for sticking to "*first principles*," and ignoring the doings of any particular company, we are taken to several places, and told of the wonders that are done in them. Well, I cannot wander through all the towns, but I cannot refuse a visit to two of them. First comes Carlisle—coals are stated to cost there 10s.; at Reading, they cost 17s. Products at Carlisle, Mr. Simonds says, yield 13s. per ton; while, at Reading, they only yield 7s.; so that, while at Reading the net cost of coals, after deducting the value of residual products, is 10s. per ton, the cost of coals at Carlisle, according to Mr. Simonds, is 3s. per ton *less than nothing!*

And this is quoted as a standard for comparison with Reading!—a presumed, but not a *real* parallel, the result being to show that, at Reading, the cost of gas per 1000 feet is nearly 1s. 6d. more than at Carlisle, for coals only; so that, according to Mr. Simonds, the cost of coals *has*, after all, *something* to do with the cost of *gas*.

The next town mentioned, is that brewers paradise, *Burton*, which we are told, "*singularly* tallies with Reading, taken comparatively;" let us see: the consumption of gas at Burton is about one half that of Reading—the capital raised £18,500, and at Reading about £30,000, so that, at the latter place, the consumers enjoy the benefit of having the same comparative amount of business done by means of the expenditure on the part of the companies of £7,000 less capital than at Burton, and, in round numbers, the directors of the Reading gas companies have only expended three-fourths of the amount of the capital which the Burton corporation have used to produce the same result; and, consequently, if 2s. 6d. per 1000 feet profit would pay a given amount of dividend in one case, 1s. 10½d. profit per 1000 feet would pay the same dividend in the other.

Now for the cost of the manufacture at Burton as compared with Reading: the price of coals at Burton is stated to be 9s. 5d.; at Reading it is 17s.; the quantity of gas yielded being the same in both cases, and the value of residual products the same in each. The net cost of coals, therefore, is 7s. 7d. per ton more at Reading than at Burton, which adds 10d. per 1000 feet to the cost of gas; and, as gas is sold at Burton at 4s. 2d. per 1000 feet, and at Reading at 5s., the difference is disposed of, and the Burton bubble may be regarded as burst—another illustration being thus furnished of the fact that the cost of coals has *something* to do with the cost of gas.

And now, gentlemen, I think it is time to draw these remarks to a close. I have only dealt with the first half of the speech of Mr. Simonds, but, as the first half corresponds in character with the latter half, I will leave the remainder with the hope that I may be excused from the task of taking up any more of your time or my own in the discussion of it.

I may have handled Mr. Simonds with some degree of severity, but I must say, generally, in addition to what I have said in detail, that I do not envy the gentleman, whoever or whatever he may be, who can stand up as Mr. Simonds did at the meeting in question, and with such exceeding bad taste, so inconsiderately, rashly, and falsely, charge the directors of two respectable companies, called into existence, and then existing in his own town for the supply of a public want, and which public want they are now supplying on liberal terms, and at only a moderate rate of profit to themselves, with having "mulcted" their customers "to a large extent;" in other words, that they have wrongfully taken money out of other people's pockets. And, on a careful review of the whole proceedings, I say the attack upon the gas companies was got up and conducted in a most discreditable manner.

Mr. Rogers, hunting for popularity, goes to Mr. Hughes in London to be crammed, and crammed he was; in his turn, he crams Mr. Simonds, and this latter gentleman "comes out" rather "smart" as the champion of his party. Then comes the specification, *such a specification* that I cannot tell you how highly I prize the copy which you sent me. Who could be suprised at your feeling the want of an opinion and advice upon such a document? I answer, none but those who sent it you, and who would like no doubt to have caught you in such a humane mantrap, and who, I observe, now find fault with your "calling in a stranger." Really, if it be not refreshing, it is at least amusing to witness such a display of *patriotic innocence;* these gentlemen who, with *all their great talents* combined, could not get up a specification, but must go to London to get it done, and bring it home, and put it forth *without* the author's name, are astounded that so simple, fair, and straightforward a production should occasion *you* the least thought or anxiety, and marvel that you could not deal with it off-hand. Well, we do sometimes find a great amount of simplicity combined with inordinate vanity, and as I fancy that both these qualities have been abundantly displayed in this matter by one of the members of the Reading Local Board of Health, and the clerk of the board, I hope they will condescend to come down from the lofty height to which they have flown, and learn a lesson in the valley of humility from the exposures of their blunders, which they will find in this report if they should happen to read it.

I am gentlemen, your obedient servant,

R. P. Spice.

County Chambers, Cornhill, London, Aug. 28, 1861.

THE MANUFACTURE OF CAST-IRON PIPES IN AMERICA.

By Edward Brant, Esq.

[From the *Journal of the Franklin Institute.*]

At the expense of much time, and subjecting myself to no inconsiderable labour and inconvenience, I have been enabled to accumulate the annexed particulars, which were the prominent features embodied in a report upon the manufacture of cast-iron pipes, submitted by John H. Rhodes, Esq., Inspector, &c., to the chief engineer of the water-works, Brooklyn, New York. It deserves the closest perusal of all who are in any way whatever connected with water-pipe castings, as its descriptions of the defects most usual, those that only periodically and under certain circumstances occur, are clearly given, together with such rules and suggestions as will enable manufacturers to avoid them in the future.

As it will be observed, the report compares the vertical pipe-castings with the horizontal, and advocates the former.

The acceptance of defective castings, and their use in the pipe distribution of a city, create, sooner or later, leaks and breaks in the works of which they become a part, causing much trouble and expense to the public; therefore, that intelligence which will cause the arrest of such imperfections in the manufacture of cast-iron pipes should commend itself to the attention of public authorities, as well as that of manufacturers, inspectors, &c.

Mr. Rhodes says:—

Sir—Having concluded the duties to which I was ordered by you, I now present my report, together with such information in reference thereto as I have been enabled to obtain.

In the conrse of the discharge of my duties, I have found a great proportion of the work so faulty as to lead me to a critical examination of the manner of manufacturing, and the cause of the defects. The proportion of bad pipes which I have from time to time met with has been so great (sometimes as high as 50 per cent.), as to create great doubt as to whether the remainder would be practically safe, although showing no defects to the eye or weakness under the application of the required pressure. I have observed, and hereafter shall endeavour to show, that in casting pipes horizontally, difficulties present themselves which are almost insurmountable. A perfect pipe cast in this manner is the exception and not the rule, inasmuch as these difficulties are in themselves not mechanical but natural, and are peculiar to the manner of moulding and casting it. I shall further endeavour to show that the main difficulties met with, in casting pipes horizontally, may be avoided by casting vertically, thereby insuring the greatest degree of safety and durability.

In accordance with your orders, I proceeded to the foundry of Messrs. Colwell and Co., at Conshohocken, Pa., on the day appointed, to inspect and prove the pipes under the contract of Messrs. H. S. Welles and Co., for

the Brooklyn Water-Works, where I continued to discharge that duty for six consecutive months, during which time I inspected and proved 6432 pipes, consisting of 3369 6-inch, 2230 8-inch, 423 20-inch, and 250 30-inch; rejecting, upon inspection under proof, 158 6-inch, 98 8-inch, 58 20-inch, and 14 30-inch. A very considerable number in addition were rejected without subjecting them to the proof. The above were rejected from one or more of the following causes—viz., blisters, sand-holes, shrinkage-cracks, air-cells, and cold-shuts.

The 6-inch and 8-inch pipes were cast in green sand moulds with green sand cores, placed horizontally. These were more particularly liable to defects from sand-holes and shrinkage-cracks, and occasionally from blisters; the first being caused from the cutting of the cores, or moulds, or both, from the abrasion of the hot metal in flowing through the mould, or by the core or mould having been injured or loosened in closing the flask. Many are also objectionable from their uneven thickness. The cause of these difficulties being attributable, in a great measure, to the *manner* of moulding and casting them, will be more particularly explained hereafter.

The 20-inch and 30-inch pipes were cast vertically with the "hub" end down in "dry sand moulds" and "loam cores." The loss upon these was mainly attributable—1st, to an intermixture of sand or scoria with the iron; 2nd, the washing-off of the blacking from the mould or core, not unfrequently forming a "parting" of the iron, nearly or quite through the thickness of the pipes; 3rd, "cold-shuts" in the body of the pipe; 4th, shrinkage recesses in the "hub"; 5th, "air-cells" through the centre of its thickness; the latter being caused principally by an improper admixture of the sand used in forming the mould. One, and the great cause of failure in casting pipes vertically, may be found in the fact that the casting is not poured with sufficient rapidity, but by dribbling the iron through a back-runner until the mould is half filled, then pouring the residue from above through small gates or openings, and an insufficient number of them has necessarily led to the castings being imperfect from "cold-shuts," "air-cells," and not unfrequently a large recess in the "hub," almost hidden from sight. This may be readily explained in this way: the iron having poured too long from the back-runner, making the heat intense at the point of its connexion with the "hub" long after the rest of the pipe had chilled, leaving consequently, no means for the shrinkage at that point to receive metal to fill the space made by its contraction.

Subsequently to the visit made at Conshohocken, I received your orders to proceed to the works of the Warren Foundry and Machine Company, N. J., who were then engaged in casting 6-inch, 8-inch, 12-inch, 20-inch, 30-inch, and 36-inch pipes for the Brooklyn Water-Works. Upon entering on my duties there, I found 107 6-inch, 53 8-inch, and 24 12-inch pipes ready for inspection. Upon examination, I accepted but 62 of the 107 6-inch, but 19 of the 53 8-inch, and 7 of the 24 12-inch. The proportion of perfect pipes was so small as to create no inconsiderable excitement within myself, and very great apprehension among the stockholders of the company; so much so that, after a few subsequent trials, they gave up as impracticable the casting of small pipes as a source of profit, believing that they would not be able to fulfil the contract for that class of pipes without subjecting themselves to great loss.

The manner of moulding these differed materially from those cast at Conshohocken. They were cast in "green sand moulds" and "loam core," set up at an angle of about ten degrees, poured from one end of the flask. A very large proportion of them were "blistered." "Sand holes" were common, and the "cope," or tops of the pipes, were very thin near their centre of length, caused by the springing of the "core bar;" and that difficulty being frequently increased by the scorching of the straw rope while in process of drying, thereby causing it to loosen and rise upon the bottom and sides of the "core bar" by the pressure of the surrounding iron, while being cast; or, it may be very thin from the "boiling" of the metal, in consequence of the core not being dry. It is thus evident that an accurate judgment is necessary in preparing the cores. I shall refer to this part of the subject, and explain more fully hereafter.

I now come to the consideration of the 20-inch, 30-inch, and 36-inch pipes, which were so successfully cast at this foundry by Messrs. Firth and Ingham, who were sub-contractors with the Warren Foundry and Machine Company, to cast these pipes and deliver them ready for inspection. To this firm is essentially owing the great success which has been achieved in casting the force mains and large branches for the works. I take great pleasure in having an opportunity to state that they have scarcely lost a pipe in casting that has not been owing to improper material accidentally furnished them.

These pipes have undergone a very severe inspection and proof, in effecting which (although the loss, if rejected, fell upon them), I have always received their hearty co-operation; and I have to record that I have not, in a single instance, known them to make an attempt to conceal imperfections; upon the contrary, they were gentlemanly and communicative upon all matters relevant to my duties, and I have derived from them great practical information. I have here inspected 112 20-inch pipes, rejecting 2; 113 30-inch pipes, rejecting 2; 74 36-inch pipes, rejecting 4; 32 30-inch bevel hubs, rejecting 1; 40 36-inch bevel hubs, rejecting 1; force mains 1½ inch thick, 196 36-inch, rejecting 4; force mains 1⅜-inch thick, 158 36-inch, rejecting 8; force mains 1¼ inch thick, 356 36-inch, rejecting 4; force mains 1⅛-inch thick, 126 36-inch, rejecting 5. (I am led to believe, upon examination, that the strongest and soundest pipe of 36-inch diameter is much in favour of a weight not variable far from 3600 to 4000 lbs.) Increased care became necessary in order to make sound castings of 1½-inch thick, as the increased thickness caused the centre of the pipe (in reference to the thickness) to remain much longer in a fluid state, and particularly so at the "hub" end, where there is a very much larger amount of metal, that in shrinking was continually drawing from the centre of the pipe (in thickness), rendering it necessary to "churn" the runners, and continue the supply of hot metal for some time after the cast was "up."

I believe that 36-inch pipes of over 3600 lbs. weight might be cast to advantage 6 inches over the required length, to be subsequently cut off in a lathe. Had this course been followed, we should have lost none of that diameter, as I have met with no unsoundness, in that class of pipes, which has extended more than that distance from the spigot end, rarely more than 2 inches.

Having thus had an opportunity of comparing the relative merits of the various modes or plans pursued in casting iron pipes, I am fully convinced, from my own experience, that *all* pipes, large or small, should be cast *vertically*. In order to show how I have been thus convinced, I will make a comparison between "green sand" pipes, cast horizontally or inclined, and "dry sand" pipes, cast vertically. In order to do so, I will now give a particular description of, and examine:—

First, the defects of the system of making "green sand" pipes with "*loam* cores."

Second, the defects of the system of making "green sand" pipes with "*green sand* cores."

Third, I will endeavour to show how their defects may be avoided by casting pipes vertically in "dry sand moulds" and "loam cores."

First.—The defects of the system of making "green sand" pipes with "loam cores" are so various that, in order to explain them clearly, it will be necessary to examine them in detail. For that purpose, I will classify them as follows, viz.:—

1. Their tendency to unevenness in thickness.
2. The cause of "blows" or "blisters."
3. The causes that tend to weaken the side of the pipe lying uppermost in the mould.

First. Green sand pipes with loam cores are generally uneven in thickness, often to the extent of one-half or more of the required thickness of the pipe. This unevenness is caused in at least five different ways, and each of these causes of irregularity may be at work together or separately.

1, The spring of the core bars by the lift on them. On a 12-inch core, when the pipe is cast at the usual angle of about 10°, it is about 3100 lbs., the weight of the core is about 700 lbs., so that the effective lift upon the core is about 2400 lbs. The lift upon an 8-inch core is about 900 lbs., and of a 6-inch core about 500 lbs. The spring of a 12-inch core bar is so small as to be of little importance, but as you decrease that diameter it becomes very considerable. The spring of an 8-inch core bar varies from 1/16th to 1/8th of an inch; a 6-inch core bar will spring from 1/16th to 3/16ths of an inch, and below that diameter it becomes necessary to use chaplets or nails.

2. The rising of the loam or coating on the bar. This may be caused by running the straw ropes on the core bar too close together, or through the ropes being too soft, or not drawn sufficiently tight; and, as any of these evils are much easier upon the workmen than the proper way, they are often indulged in; but the principal cause of the rising of the loam core is the burning of the ropes in the drying oven by what is called "scorching or high drying," the object of which is to prevent "blisters" on the pipe. The adhering principle of loam is a vegetable matter which burns with the heat of the iron, thereby generating a gas, which is one of the principal causes of "bilsters," and by scorching the core they thereby avoid a portion of it; but in scorching the loam they also scorch the straw rope, so that the base of the loam is partially destroyed, and the pressure of the iron (when casting the pipe) forces the loam close to the bar; and, as the pressure of the iron acts upon the bottom of the core first and then upon the sides, as it rises in the mould, the loam is wrapped close to the bottom and sides of the bar, and is consequently lifted upon the top, where it remains; for the pressure upon the iron at the bottom is greater than upon the top of the mould, and to that extent will the pipe be thinner upon the top than upon the bottom. The larger the diameter of the core, the greater the evil from the core rising from this cause.

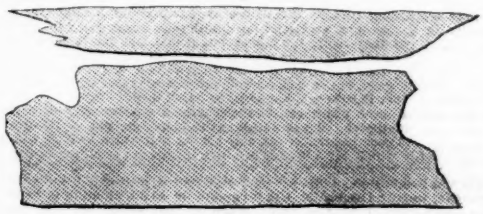


Fig. 1.

The above diagram shows the full size of a specimen taken from the top and bottom side of a 16-inch pipe cast for the Hoboken Water-Works.

3. The manner of securing the cores. They are wedged down at the ends by wooden wedges driven under the wooden handles of the flask, while the bearing of the core is a "sand print" of a few inches in length. If they are wedged down too tight, the core is forced too low, and if not wedged tight enough, the core will rise. This is done with but little judgment, commonly by men who do not know how much the core will lift, or what pressure they are putting on the wedge.

4. It is common to set the core a little below the centre in the mould, as the core might rise, or the bar might spring, or the loam might rise upon the bar; and, under any circumstances, the top of the pipe is weaker than the bottom, and if a little thicker it would help it. With this system of moulding, it appears to me to be good judgment to place the core at least 20 per cent. of the thickness below the centre, being obliged thus at the outset to consent to and desire an uneven thickness of pipe at the ends, in order to obtain the greatest mean strength.

As the transverse weakness of a pipe is mainly caused by the action of shrinkage (in an uneven pipe), it may be almost to a breaking point, and yet not be discovered until after the pipe has been laid in the ground, when its weight may cause it to break. If the pipe be uneven to a very considerable extent, and the shrinking has dangerously affected it, it will not be straight, having been drawn from a straight line as follows: the side of the pipe that is thinnest will cool first, and contract before the thick side; the thick side being in a semi-fluid state will yield to the strain; but the thick side must shrink also, at which time it will be found that the thin side has cooled, and refuses to give way in turn, but the shrinkage will go on, and the pipe assumes a curved form, the heavy or thick side forming the concave. The above description holds good when the mould has been straight, and the core placed nearer one side than the other, as in the case when a core rises in a "green sand" mould, or is set out of centre in a "dry sand" vertical mould.

But, a pipe cast as before described, does not always assume a curved form, as the moulder not unfrequently takes the advantage of turning the mould over when hot, whereby the thin or "cope" side is covered by the hot sand, while the "drag," which is thickest, is exposed to the action of the air, and thereby cools much faster than the thin side, which is protected by the hot sand, in which case the curve may be so little as to be scarcely discernible. Still the pipes remain uneven in thickness; and, should it be of small diameter and thin, the bending tendency will much weaken the pipe on the thin side, and in a manner that cannot be discovered by the present manner of proving by the press, as the very means taken to procure the pressure insures its safety, for its only tendency is to a transverse fraction.

5. In clamping the moulds. This evil is not so common as the others; and, when a mould is clamped thin, it is caused by carelessness or laziness. With care and judgment, this evil may be avoided.

Secondly. The cause of "blows" or "blisters." The cause is not very easily described, but its appearance and characteristics I will endeavour to explain and show. A blister is simply a recess in the body of the pipe, covered by a shell inside and out, and frequently giving no sign of its presence, particularly to one not thoroughly practised in its search. They assume all imaginable forms, some appearing, under certain circumstances, as follows :—

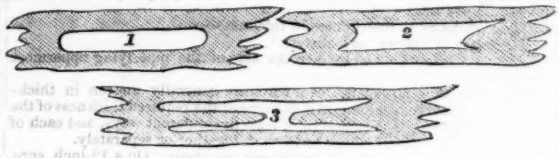


Fig. 2.

And they may be found from the size of a pea, extending to several inches in length. The shell covering varies in thickness, but will commonly be from 1/16th to 3/16ths of an inch. In a pipe one-half inch thick, the blisters are invariably on that side of the pipe cast uppermost, commonly called the "cope," and may be found any where in the direction of its length, but generally about the middle. These blisters will occur when the core is not thoroughly dry, or when the loam is "too close," or if there be too much vegetable matter in the loam. Again, a pipe is almost sure to blister if it is poured with "dull" iron, or if it be poured slow, even with iron tolerably "sharp."

In connexion with the above, there would seem to be a fact overlooked by moulders generally, which has much to do with the difficulties which have presented themselves; it is this: "dull" iron has less specific gravity than "sharp" iron. This may be questioned, but can be easily accounted for. It is shown practically in casting pipes, and is subject of proof if necessary. The difference in weight between sharp and dull iron is not so great as to cause the iron in a mould or ladle to assume a level just in proportion to its temperature immediately, for the reason that iron is so heavy that it requires no inconsiderable force to set it in motion, the difference in the specific gravity not being sufficient to create a rapid circulation; but, should the current of circulation favour the "dull" iron, being uppermost, it will assuredly maintain that position. In order to render this more intelligible, I will endeavour to illustrate the effect by giving a description of casting a pipe which fails to run to completion. Suppose we undertake to pour a green sand pipe at the usual angle for "loam" cores, from the *bottom* of the mould; the iron which first enters through the gate will be cooled in its passage over the cold mould, and rises to give place to the hot iron following, which is continued to be displaced by the current of incoming hot iron. The iron which first entered, will be the "dullest," and consequently the lightest, and will keep uppermost as it is pressed up by the under-current of hot metal, until it finally becomes chilled and will run no further, in which case the pipes will not be run complete, which is no uncommon occurrence; but, should you run the pipe from the *top* of the mould, this difference is partially avoided, and only partially, for the iron falls to the bottom side of the mould as soon as it enters, and the whole current runs down the mould under the core until it reaches the lower end of the mould, or to the level of the iron in the mould, as the case may be.

It may be readily seen, from the fact of the hot iron all running down under the core, and the dull iron, being lightest, that the last will rise upon the opposite side; hence it will be seen that all the dull or chilled iron will be upon the line of the top of the pipe, and as dull iron is more favourable for the production of blisters than sharp, it becomes one of the causes of blisters in the top of pipes.

The most prolific causes of blisters are produced by a steam arising from a damp core, or the gas generating from the burning of the vegetable matter contained in the loam from which the core is made; there not being sufficient pressure in the monld at the time the gas is generated to force it through the loam to the holes in the core bar intended as its means of escape, it consequently forces itself into the iron, which it can more readily displace while the pressure of the iron is low. The specific gravity of the gas being so much less than the iron, it makes its way to the top, let it be projected from which point of the core it may, and, as I have before shown, the dullest iron in the mould is on the top of the core; this dull iron sets rapidly around the gap, as in Fig. 2 (No. 1); or, if the pressure is "up" before the iron sets, the gas may be compressed a little, and a portion of the iron flow back into the space, as in Fig. 2 (No. 2); or, the pressure may be sufficiently strong to force a portion of the gas through the iron into the "green sand," or back again into the core, and leave a blister similar to that in Fig. 2 (No. 3). Or, as is sometimes the case, the blister will be entirely filled up, leaving the shell of the blister unmelted, in which case the shell can be knocked off, and the iron under it will show conclusively that it is a second run.

I will endeavour to explain why it is that blisters are generally found at about the centre of length of the pipe. In drying the cores in the oven, the outside of the cores is about equally exposed to the heat, but that is not so with the inside. It will be easily observed, that the dampness will pass off in the form of steam much more readily from the ends of the bar than from the middle, by means of which the ends get a little more firing than the middle. This, together with the greater pressure upon the bottom of the pipe, would seem to account for the ends being more free from blisters than the middle.

Another difficulty is frequently met with by not having the cores dry, which produces a boiling of the metal upon the upper surface of the core, leaving the pipe very thin. The subjoined diagram is taken full size from a specimen of pipe six inches in diameter.

Fig. 3.

Thirdly. I will now review the causes which tend to weaken the top of a pipe cast inclined or horizontal.

1. The unequal thickness.

I observe that every thing that tends to make a pipe uneven, does to that extent make the upper portion of it thin, and this tendency is so great that I will venture to say, that if one hundred of the pipes cast under this system were broken, not one of them would be found equal in thickness from end to end, and many of them would vary from 25 to 50 per cent. below the required thickness.

Again, into that part of the pipe which is liable to be thinnest is floated the dullest iron, and the pressure put on so slow in pouring, that the iron is liable to become set before it is pressed compactly together. The evil effects of this are shown by the liability of the pipes to be blistered and "cold-shut," and all the particles of sand that wash from the mould, together with the blacking washed from the core, with whatever "slag" gets into the mould, or dirt thrown out by the iron while it is burning, is floated to the top of the pipe, causing that portion of it to become dirty, porous, and thin, with an occasional "cold-shut."

Fig. 4.

The above diagram is made from a specimen taken from an 8-inch pipe. This pipe bore the pressure of 300 lbs. to the square inch, but was rejected from the discovery, at the distance of only 2 feet, of a place similar to the one submitted above; neither of them leaked. Now, it may be asked, how is it that, with all these defects, the pipes are enabled to sustain the pressure applied to them? The answer is simply this: The pipes are made of a thickness to meet the exigencies of the manufacture, and the amount added for the life of them, and for the risk attending such defects, gives a large margin in excess of what would be necessary for the required strength merely. I am required to put a pressure of 300 lbs. per square inch upon a 36-inch pipe, its thickness slightly less than an inch; and put the same amount of pressure upon a 12-inch pipe, its thickness one-half of an inch (which is very light for that diameter), yet, in proportion to its diameter, it is 50 per cent. heavier than the one 36 inches in diameter. But the latter pipe cast vertically is infinitely the safest, as is shown by inspection.

SECONDLY.—I will now consider the defects of "green sand moulds" and "green sand cores." This class of pipes are cast upon a level, and are run from each end.

The objects in using green sand are substantially these—viz: The saving of straw, the labour of making the ropes and putting them on the core bar, and drying the cores. If the cores are properly made, there is much less risk of forming blisters; indeed, the ratio of pipes saved by this method far exceeds the "loam core inclined pipe." But this system has some drawbacks, and I believe that it is found, upon the whole, to be but little cheaper than the loam core in point of labour; but, as I before stated, it is a safer method than the loam core and dry sand mould.

To use green sand cores, the following conditions must be complied with:

The core sand must be very open or coarse, and used as dry as practicable.

The cores cannot be "sleeked," nor can they be blackened.

The sand must be put on the core bars by hand as lightly as possible, in order to adhere to the bar, and finished by sifting sand upon them as a finishing coat.

They require pouring very fast with sharp iron. These conditions are absolutely necessary, and, if not complied with, will result in the blistering of the surface, or an admixture of sand and iron through the pipe. To make good pipes by this method, it is necessary to pour them quick and with sharp metal. To do this with "green sand cores" will be likely to produce the following results, viz.: 1st. The core sand is coarse and dryish, and not sleeked, and, in consequence, the hot iron will wash off a great amount of sand that is just sticking fast enough not to fall off, and will carry it into the pipes. And further, from the core not being sleeked or blacked, and being coarse, the hot iron will enter freely into the pores of the sand, which will fasten a heavy coat of coarse sand over the surface of the inside of the pipe. 2d. The pipe must be poured up quick with hot iron, so as to put on a sharp strain, to prevent blisters, and as the cores are soft they strain along the bottom; and as the sand of the core is pressed on the core bars by the fingers, there are frequently numerous small soft places which will strain most, thereby causing the inside of the pipe to be very uneven. The spring in the core bar is about the same as in a loam core.

The running surface is very great, about 150 inches area; but this evil is modified to a great extent by running the pipe from each end. It being cast horizontally allows the dull iron and dirt to rise to the top of the mould, causing a liability of the pipes to blister or cold shut upon its upper surface.

It is evident that this class of pipes, like those with loam cores, have a *soft side;* the top is liable to be thinnest, and is cast with the dullest iron, and into this side is washed all the loose particles of sand that are washed from the unsleeked core; the light pressure which is put upon the metal in the top of the pipe (probably not more than 2 lbs. to the inch), and the large running surface unite to cause it to be blistered and "cold shut," as the amount of pressure is insufficient to press the iron compactly together along its whole length, when it is in the condition above described. Why not increase the pressure on the top of the pipe? If the pressure is increased on the top of the pipe, you increase it also on the bottom, and it is much more effective on the bottom, because the iron is hotter and more fluid, and thereby causes a still greater strain upon the bottom of the core, which, being soft, gives way, and renders the inside of the pipe very rough and uneven, thereby causing a serious obstruction to the passage of water. The service obtained from this class of pipes, for the above reasons, will be much less than from those of the same diameter with smooth bore.

I have shown the difficulties to be met with in green sand moulding to be of a character which may lead to great doubts of the expediency of running so great a risk as must needs be in using castings of that character. I have considered these difficulties under the following heads—viz:

I. Their tendency to uneven thickness.
II. Their tendency to blow or blister.
III. Their tendency to be very weak upon the top or cope side, and the causes which led to the first of these—viz., their tendency to uneven thickness—being again subdivided in the following order—viz:

1st. Spring of the core bar.
2nd. Raising of the loam of the core upon the bar.
3rd. Manner of securing the core.
4th. The necessity of setting them out of centre.
5th. Clamping.

THIRDLY.—I will now endeavour to show that these evils may be avoided by casting vertically.

1st. "Spring of the core bar." The core bar being placed in a vertical position cannot spring, as there can be no lift upon it or tendency to move in any direction.

2nd. "Raising of the loam of the core upon the bar." The loam upon the bar, however loose, must be equal all round, the pressure of the iron being the same upon all sides, at all times during the "pour."

3rd. "The manner of securing the core." As there is no tendency for the bar to move from the position in which it is placed, it only remains for the mechanic to make such arrangements as to insure its centering properly, which is done by having the lower end of the core bar turned to fit a corresponding opening or sent, which effectually prevents its getting out of centre, while the upper end being in sight can be easily adjusted, and set to a gauge. Hence, there is no more excuse for the core being out of centre, than there is for the pipe being improperly made from any other cause. It, however, may be of uneven thickness, though the cores may be centered properly, should the mould be crooked; but this, like the above, is not a natural difficulty, but is the result of carelessness or negligence of inexperienced operators. An effectual check may be put upon that objection by requiring them to be within certain limits, and rejecting any that should be beyond them; and, as there are no natural or mechanical difficulties to surmount, proper care would soon rectify it.

4th. "The necessity of setting the core out of centre." As the cores have no tendency to change their position whilst the pipe is being cast, as a consequence, there can be no necessity for setting them out of centre in order to insure an average pipe; it would indeed have an opposite result.

5th. "Clamping." Inasmuch as the flasks are clamped before they are "rammed," no difficulty from this cause can arise.

II. I next consider their inability to "blow" or "blister."

1st. In casting vertically, the hot iron is run on all sides of the core at the same time; and, consequently, there is no point at which the iron is in a "duller" state than in another.

2nd. If there should be, the "dull" iron would naturally rise on top, and would be in a position to catch the hot falling iron; and, as a stream of fluid iron continuing to fall short for a short time upon cold iron is capable of bringing it into a fluid state, it must necessarily have the effect of keeping the top surface of "the cast" in the "sharpest" possible condition.

3rd. The pressure is run up very quick, and the running surface very small. This effectually avoids blisters by pressing the iron compactly whilst it is "sharp," and holding it there so firmly that the gas from the core more readily makes its way to and out of the core bar, than it can displace the iron in the mould.

It will be seen by comparison that the running surface of a 6-inch pipe, cast vertically, is about 10 square inches, and the running surface of a pipe of the same diameter, cast at an angle of about 10°, will be about four and a half times that amount, and being only about 2 feet from the lowest to the highest point; whereas, the vertical pipe is its length (say 9 feet), but one-third of the inclined pipe will have an elliptical running surface of 6½ inches diameter one way, and 3 feet 1 inch the other; this surface will vary in width from ¼ to 1½ inches, giving a running surface of 72 inches area. Thus, it will be seen that the part of the pipe which is usually blistered, is filled more than seven times as quick in a vertical mould than it is in an inclined one—*i. e.*, supposing the two pipes to be of the same length and diameter, and cast in the same period of time. And further, I repeat that, instead of having the dull iron all driven to one side of the pipe, you have hot iron dropping into the cast upon all sides of the running surface, varying from 9 feet, or the length of the pipe, to 0. Again, when the vertical pipe is cast, there will be from 12 to 15 lbs. pressure per inch in the middle of the length of the pipe (9 feet), whilst the inclined cast has but 3 to 5 lbs. per inch.

III. "The tendency to weakness on the cope side." There being no cope side, this weakness is entirely avoided; in other words, there is no particular point of weakness in a vertical cast pipe.

"Cold Shuts." The running surface in a vertical cast pipe is so small, that the hot iron falling into it renders the liability to "cold shut" almost an impossibility. The mould and core are of such a nature, that if properly made and thoroughly dried, they will stand the passage of a current of iron as nearly perfect as sand moulds can do. There is little or no straining either in mould or core, and this is an important feature, for all strains are a total loss of so much iron that is taken away from other parts of the pipe.

They are cleaner. In casting the pipes, the iron is poured into a basin that surmounts the top of the flask and surrounds the core, the runners are in the bottom of this basin, which is instantly poured full, and kept in that state until the pipe is "up," whilst the dirt which gets in this basin (if any) from the ladle, will float there and cannot get into the pipe. Yet, there is dirt or impurities constantly giving out from the iron, when in a fluid state, of some manufacturers more than in others; but all gives off more whilst in motion than when at rest; thus all castings will have some dirt in them, however carefully the ladle may be skimmed, because the dirt continues to rise so long as the iron is in a fluid state. In pipes, the dirt assumes various forms or positions, depending wholly upon circumstances. In those of large diameters, cast vertically, when the thickness is great, it will collect in lumps and float towards the top, where it is occasionally intercepted and forms a soft place, which will usually "sweat" under pressure, and consequently may be readily found in the press. But in those of small diameters, cast in the same manner, so much of the running surface is covered by the runners, and the cast is brought up so quickly, that the dirt has but little time or opportunity to separate from the iron and collect in a body, except in cases where the iron is *very* dirty, when it will rise towards the top, in which case the proof pressure will find it. The dirt here spoken of is that which separates from the iron after it has passed the runners into the mould, and is about the same in quantity in any kind of mould, it depending upon the weight of iron poured and the quality of iron used.

In conclusion, I would remark, that the superiority of the vertical over the horizontally-cast pipes, consists principally in the following advantages:

1st. There is no lift to the core, or tendency for it to move from the position it is placed in.

2nd. The small running surface.

3rd. The rapidity with which the pressure is put upon the iron whilst it is in a fluid state.

4th. The iron falling directly to its place with all the velocity and force of its gravity, thereby thoroughly mixing the hot iron with the whole running surface.

5th. The firmness of the mould.

6th. The facilities for making the casting clean.

7th. The ability to increase the length of the pipes without endangering the perfection of the casting, thereby saving in weight of casting, cost of labour, and material in laying, to which add the saving of lead joints, in itself an item of importance.

In reference to the transverse strength of pipes of small diameter, I herewith submit a tabular description, taken from experiments made at the Warren Foundry, Philipsburgh, New Jersey.

TRIAL A.—CAST VERTICALLY.

Pipe 4 inches inside diameter, ⅜ths of an inch thick, weighing 201 lbs., 12 feet long; supported at the extreme ends. Weight applied on slings placed 3 feet from each end. Points of deflection taken 3 feet from each end, and centre.

Weight in lbs.	Hub End.		Middle.		Spigot End.	
	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.
1000	·25	·25	·31	·31	·25	·25
2000	·12	·37	·25	·56	·18	·43
3000	·31	·68	·37	·93	·25	·68
4000	·32	1·00	·38	1·31	·28	·96
5000	·31	1·31	·50	1·81	·29	1·25
5500	·19	1·50	·25	2·06	·18	1·43
6000	·12	1·62	·19	2 25	·13	1 56
6225	Broke in two places, 5 inches in from point of weight.					

TRIAL B.—CAST VERTICALLY.

Pipe 4 inches in diameter, ⅜ths of an inch thick, 12 feet long, weighing 202 lbs.; supported at the extreme ends, and weights applied in the centre, suspended by a sling. Points of deflection taken 3 feet from the ends, and centre.

Weight in lbs.	Hub End.		Middle.		Spigot End.	
	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.
1000	·18	·18	·31	·31	·18	·18
1500	·19	·37	·25	·56	·19	·37
2000	·19	·56	·31	·87	·19	·56
2500	·19	·75	·25	1·12	·19	·75
3000	·25	1·00	·31	1·43	·28	1·03
3250	·06	1·06	·19	1·62	·03	1·06
3375	·09	1·15	·06	1·68	·09	1·15
3500	·03	1·18	·13	1·81	·01	1·16
3625	·07	1·25	·06	1·87	·05	1·21
3750	·06	1·31	·13	2·00	·07	1·28
3850	Broke 12 inches from centre, towards the hub.					

TRIAL C.—CAST VERTICALLY.

Pipe 6 inches in diameter, ⅜ths of an inch thick, 12 feet long, weighing 340 lbs.; supported at the extreme ends, and weights applied on slings placed 3 feet from each end. Points of deflection taken 3 feet from each end, and centre.

Weight in lbs.	Hub End.		Middle		Spigot End.	
	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.
1000	·03	·03	·03	·03	·03	·03
2000	·09	·12	·15	·18	·09	·12
3000	·09	·21	·13	·31	·09	·21
4000	·07	·28	·03	·34	·07	·28
5000	·06	·34	·09	·43	·03	·31
6000	·09	·43	·16	·53	·06	·37
7000	·07	·50	·10	·69	·06	·43
8000	·00	·50	·06	·75	·07	·50
9000	·09	·59	·06	·81	·06	·56
10000	·09	·68	·09	·90	·06	·62
11000	·13	·81	·13	1·03	·10	·72
12000	·03	·84	·15	1·18	·03	·75
12900	Broke at the points of weight.					

TRIAL D.—CAST VERTICALLY.

Pipe 6 inches in diameter, ⅜ths of an inch thick, 12 feet long, weighing 344 lbs.; supported at the extreme ends, and weight applied on slings at the centre of length. Deflection taken at points 3 feet from each end, and centre.

Weight in lbs.	Hub End.		Middle.		Spigot End.	
	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.	Partial Deflection.	Whole Deflection.
1000	·12	·12	·12	·12	·06	·06
2000	·06	·18	·19	·31	·12	·18
3000	·13	·31	·06	·37	·07	·25
4000	·06	·37	·13	·50	·06	·31
4500	·06	·43	·09	·59	·06	·37
5000	·03	·46	·06	·65	·06	·43
5500	·10	·56	·10	·75	·07	·50
6000	·06	·62	·06	·81	·06	·56
6500	·06	·68	·12	·93	·06	·62
7000	·07	·75	·13	1·06	·06	·68
7500	·06	·81	·06	1·12	·03	·71
8000	·06	·87	·06	1·18	·04	·75
8500	·06	·93	·03	1·21	·08	·83
9000	·07	1·00	·22	1·43	·07	·90
9115	Broke in the centre.					

TRIAL E.—CAST HORIZONTALLY.

Pipe cast in "green sand," 6 inches in diameter, 9-16ths of an inch thick, 9 feet long, weighing 354 lbs.; supported at the extreme ends, and weight applied on slings in the centre. Deflection taken at centre of length.

Weight in lbs.	Middle.		Weight in lbs.	Middle.	
	Partial Deflection.	Whole Deflection.		Partial Deflection.	Whole Deflection.
1000	·03	·03	7000	·03	·28
2000	·03	·06	8000	·06	·34
3000	·06	·12	9000	·04	·38
4000	·03	·15	10000	·02	·40
5000	·07	·22	11000	·13	·53
6000	·03	·25	11700	Broke in the centre.	

TRIAL H.—CAST VERTICALLY.

Pipe 6 inches in diameter, ⅜ths of an inch thick, 9 feet long, weighing 302 lbs.; supported at the extreme ends, and weight applied at the centre. Deflection taken at same point.

Weight in lbs.	Middle.		Weight in lbs.	Middle.	
	Partial Deflection.	Whole Deflection.		Partial Deflection.	Whole Deflection.
1000	·03	·03	8000	·10	·56
2000	·06	·09	9000	·09	·65
3000	·10	·19	10000	·10	·75
4000	·06	·25	11000	·03	·78
5000	·03	·28	12000	·03	·81
6000	·10	·38	13000	·07	·88
7000	·08	·46	13950	Broke in the centre.	

Trials F and G were upon condemned pipes. F broke with a weight of 8400 lbs., and was very defective at the point of rupture. G broke with a weight of 8325 lbs.; the casting was of poor iron and cast with wet core, having caused a boiling surface.

The tensile strength of a pipe, 30 inches in diameter, cast at the Florence Foundry, N.J., and afterwards broken up, was tried at the proving machine of the West Point Foundry, and it was found equal to 22,133 lbs. per square inch. This might be considered an average specimen of the iron used in the American foundries for pipe castings.

Specimens taken from pipes cast at the Phœnix Iron Works, Glasgow, Scotland, were sent to the South Boston Foundry, Messrs. Alger and Co., and tried by their proving machine with the following results:

Piece of 30-inch pipe,	22,978	lbs.	per	square inch.
„ 20-inch „	24,222	„	„	
„ 20-inch „	19,493	„	„	
„ 12-inch „	21,290	„	„	

CELEBRATION OF THE JUBILEE OF THE GAS LIGHTING IN BRISTOL.

We talk of social improvements that have taken place within the last fifty years with exultation, and look back at that dark age—the latter part of the eighteenth century—with a feeling of pity, dashed with contempt. All marvels in the economy of public and private life seem to have taken their rise since the year of the "Union," and to list to the jubilant contrast constantly made by us between the period when the morality or rather immorality of French republicanism had so deeply tinged Anglo-Saxon ideas, an ignorant auditor would of a truth imagine that we in the seventh decade of the 19th century were "the men, and wisdom would die with us." Of all the improvements, however, that the last fifty years have seen brought about, none is more significant of progress than the lighting with gas all the thoroughfares of our towns. To look back to the year 1800 in this respect, and conceive what the streets of London, Birmingham, our own city, or, in fact, smaller places, were after dark, without the aid of gas-light, is a task most of us would shirk rather than encounter. Yet, if we may credit ancient records, there were instances of gas, and its application to the purpose of affording public illumination, long ere Cæsar essayed the conquest of our tight little island, or even Romulus had built his first hut. Apocryphal they may be, and doubtless are, but still no true admirer of antiquity would think of questioning the verity of the following, supposed to be spoken by the mummy in Belzoni's collection:—

> Who'd think these rusty hams of mine were seated
> At Dido's table, when the wond'rous tale
> Of Juno's hatred was so well repeated?
> And ever and anon the queen turned pale;
> Meanwhile, the brilliant *gas lights* hung above her,
> Throwing a wild glare upon her shipwrecked lover.
> Ay, *gas lights!* mock me not; we men of yore
> Were versed in all the knowledge you can mention;
> Who hath not heard of Egypt's peerless lore?
> Her patient toil? acuteness of invention?

Without entering into any controversy as to the *dictum* of this preserved son of Ham, we may be excused from going further than 1812 or so of our own era, when a light was shed upon the darkness that prevailed by Winsor illuminating the metropolis with gas. All honour to old Bristol for being next, and we doff our hat to the shade of John Breillat in recording his name as that of the individual who, at his place, No. 56, Broadmead, lit up for the first time an establishment in the metropolis of the west with gas extracted from coal. We can well imagine his pride at the success of what was then an experiment, and, turning over a leaf of the record of that period, we are tempted to transcribe the circular which he sent to the various men of influence in the city. "I beg leave," he wrote, "to submit to your consideration the important advantage of gas lights for the purpose of lighting your house in preference to any other mode now in use. These lights are clear, white, and beautiful—luminous, without any smoke, or obnoxious effluvium, producing an effect equal to daylight, at about one-third the expense usually employed to obtain a miserable substitute. The heat from the furnace may often be employed for a drying stove, or other purposes, by which the advantage will be increased. Having applied myself assiduously to the above subject, lighted my own premises throughout for the last three years, erected several apparatus in Bristol, had an opportunity of knowing the various experiments that have been made, and improvements that have arisen in the metropolis, and various other parts of the kingdom, should you think proper to adopt them, I am enabled to offer myself to you with confidence, for the purpose of erecting proper apparatus upon the most economical and approved principles." Well, it was not long ere the gas company was formed; and, since its institution, we have had light shed upon our doings when the orb of day has sunk beneath the horizon, which, though it may not equal that furnished by the sun, as John Breillat glowingly asserted, is yet the best substitute that has ever been discovered. However, enough of the past, shift we now the scene to the present.

The jubilee of gas lighting in the city was celebrated at the gas-works, Avon Street, St. Philip's, on Monday, the 2nd instant. The 1st of September was the identical day upon which the event took place, and, strange to say, that, as this year, fell upon a Sunday. Mr. E. Breillat, consulting engineer to the gas company, and son of the gentleman we have referred to as introducing gas to the notice of our townsmen, signified his wish to the directors to give all the men engaged in the works a treat; and, as they expressed their readiness to fall in with his views, he specially invited all in the establishment to an entertainment on the premises of the company. Unfortunately the requirements of their duties prevented the clerks from being present, but they were permitted to console themselves with the reflection that they could have a treat another day. A half-holiday was accorded to the men, and one and all, bent upon having the affair pass off in style, set about doing their best to render the grimy buildings where their Cyclopean labours are ordinarily carried on to assume a gay aspect. One of the extensive sheds, where coal is stored, was cleared out and rendered presentable to the most fastidious eye. The roof was covered with evergreens and flags, and at either end a pipe, bent in the form of an arch, was pierced in order that it might be illuminated in the evening. The incorporated banner of the company floated from the centre, and, though not so bright as of yore, it was still an ornament of no mean pretensions. The shed was furnished with two rows of tables, upon which were laid out all the appliances for a repast, provided by that universal caterer, Mr. Hatton, of Union Street, who appears to enjoy quite a monopoly in all affairs where creature comforts are studied. Some 200 sat down to tea, and a most interesting sight it was to witness. There was one veteran present, George Hill, by name, who had been with the company since its incorporation, and many of the others assembled had grown old in its employ. Mr. E. Breillat presided, and Mr. W. G. Fiddes, engineer, and other gentlemen connected with the direction of the works, were likewise there. Prior to tea being partaken of, the arches at the extremities of the shed were lit up, and the effect was really imposing. Whatever truth there might have been in the complaints made some short time since as to the street lights, we can safely say that no fault could be found in the brilliance of the illuminations. Near the entrance to the yard was a large V. R., in gas jets, which was a splendid specimen of the company's light; while in another part of the yard was an illuminated arch, surmounted by a crown, likewise lit up, but which was not so effective as the other devices. Flags were hung across from the various buildings upon the premises, and altogether the effect of the whole was excellent. More interesting, however, by far, than the brilliant illuminations we have just glanced at, were some lights in the engineer's office. There were the original burners of the company, not such, perhaps, as some of our principal establishments in town would care to display, for they were simply a plain twisted piece of brass, but yet they were noticeable as being the progenitors of the many styles of a later date wrought in bronze, brass, and copper. The identical pipe, with its half dozen lights, that Mr. Breillat displayed in Broadmead, is also in this apartment, and, turned on to the full, the gas burned on right merrily, as if the old burner exulted in the radiance shed by the more majestic *media* of irradiation that flared around. Among the venerable relics, however, we must not omit to notice one ancient pipe wrought into a bust of his Majesty King George III., who, in sombre and discoloured brass, was represented with a veritable crown upon his brow, from which shot up a number of rays, as the insignia of royalty was pierced with jets for that purpose. The monarch might be imagined to be revelling in the diadem, which Bob. Southey in his "Vision of Judgment," so fulsomely bestowed upon him, and which the witty author of "Childe Harold" presented in such a ludicrous aspect. As soon as tea had been despatched, the company of artisans and others spread themselves about the yard, different sources of attraction being furnished. Their band, which has in the fifteen months of its formation attained such proficiency, under the able guidance of Mr. J. O. Brooke, took up their station in one part of the yard, and played an agreeable selection during the evening—Mr. Brooke leading. Let us, however, leave the musicians and come to the corner of the yard, where in busy knots so many are assembled. See, what are they at with that length of piping, and those square pieces of variegated tissue paper? Now they have inflated one of them, and are connecting it with the pipe. Yes, they are going to let up some balloons; and here one might fairly ask, were there no gas, what would the whole fraternity and sisterhood of aeronauts, past, present, and to come, have done, or would do, if no one had discovered the buoyant property of gas, and applied it in the manner it has been done? Montgolfier invented a machine that, filled with rarefied air, served to hand his name down to posterity; and Pilata de Rosa and Lunardi are renowned for their exploits in the firmament, but who would have heard of any of the trio, had it not been for the experiment of Dr. Clayton, which he made some 120 years ago? However, the *employés* at the gas-works do not, we imagine, trouble themselves much about these worthies, but are intent upon getting their own balloons in apple-pie order; and at last they have succeeded, for each rises successively until half-a-dozen have disappeared in the blue expanse. An envelope was attached to every one of the celestial cars, requesting whoever might be fortunate enough to find them, when they fell, to return them to the gas-works, with a statement as to where they dropped. This plan was adopted last summer, when the men let up a number of balloons, and they received an intimation that one fell upon Salisbury Plains. Not only, however, did music and mid-air exploits occupy the attention of the company, for their wives and children being admitted, a number of games was set on foot, which were kept up with spirit till a late hour. All was life and gaiety, thorough good-humour prevailing on every hand; and, when the time arrived for them to separate, they did so with feelings of grateful joy, their faces beaming as brightly as the lights that shot out of the illuminated arch and device that decorated the scene of their daily labour.—*Bristol Daily Post.*

TESTIMONIAL TO THE MANAGER OF THE SURREY CONSUMERS GAS-WORKS.—One of those pleasing manifestations of the existence of good feeling between workmen and their employers, which are now becoming more and more frequent, took place on Saturday, the 24th ulto., at the works of the Surrey Consumers Gas Company. For about eighteen months Mr. W. Scoble, sen., has been the manager of these works, and by his uniform kindness and care in relation to those under his orders, he has secured their affectionate regard. His good feelings towards the workmen have been especially displayed in their annual treats; for, instead of simply providing them with conveyances as formerly, he had also arranged for each man to be accompanied by a wife, sweetheart, or some other female friend, and has also found them provisions for the day. These repeated acts of kindness on his part induced the men to acknowledge them in some more substantial manner than by simply saying they were grateful. A subscription was entered into, and a testimonial was purchased. The testimonial is an elegant silver cup, bearing the following inscription:—"Presented by the Working Men of the Surrey Consumers Gas Company to Mr. W. Scoble, sen., for his several acts of kindness whilst manager of those works. August 24, 1861." The cup was presented by Mr. Donnel, who said the present was intended to show that the men felt that their manager had done his duty by them. In the name of those men, he begged to be allowed to hand him that present, with the good wishes of all hands. Nothing would give them more pleasure than to hear tell of the welfare of himself and family. If he should live to be seventy, he hoped that he would by his own fireside enjoy many a drink of toddy out of that cup, which would remind him of the esteem in which he had been held by those under his orders in the time that was past. Mr. Scoble said he was not able to express his thanks for the kind manner in which he had been remembered by the men, and that he would ask Mr. Warner to address them. Mr. Warner remarked that he spoke in the name of their manager. He believed he had done his duty at all times to the men in an upright and honest manner. He had acted impartially towards them. His several acts of kindness would not be forgotten, but would be appreciated by every man. He would find that the men would act towards him in the same upright and straightforward manner as he had treated them. There was no reason why their firm should not be as good as any other, and their manager was doing all he could to put it in that position. He then called for three cheers for their manager, which were at once given most heartily and enthusiastically.

THE LEICESTER SEWERAGE WORKS.—Mr. Wicksteed, in a recent report on sewerage, says that—"With regard to the cost of deodorizing the sewer-water at Leicester, as the facts connected therewith have been occasionally misapprehended or misrepresented, the following information may not be considered misplaced in a report of this nature. The works erected there by a private company having failed to yield any remuneration, owing to the fact that the great dilution of sewerage rendered the proportion of fertilising matter precipitated therefrom too small to be of appreciable value, they were (according to a stipulation in the original agreement) handed over to the

town council of the boroughs who have been in possession of, and have carried them on, for above twelve months. It is not generally understood that these works consist of two parts. First, of the pumping-engines employed for the purpose of lifting the water at the artificial outfall of the main sewer, which was made considerably lower than the natural one, which latter was at too high a level to allow of the complete drainage of the lower portions of the borough, and recourse was had to this plan of an artificial outfall, because it was cheaper than the construction of a natural outfall sewer would have been, which (owing to the nature of the locality) it would have been necessary to carry many miles below the borough, in order to reach a level low enough to create a sufficiently rapid current in the main sewers; but this plan was not finally determined upon without a thorough investigation of its merits, and the result has justified its adoption. The second part consists of the deodorizing tanks and machinery. The actual cost of the disinfecting process carried on at these works during the twelve months ending November, 1859, was as follows:—The quantity of sewer-water deodorized being 1,061,757,200 gallons, or 4,740,000 tons, equal to 2,908,920 gallons per twenty-four hours, or 41½ gallons per diem per head of the population. The quantity of slacked chalk lime used was 580 tons, which cost £369. 15s. The cost of labour in slacking and mixing the lime, amounted to £78. The coals consumed by a small steam-engine for working the agitators, and raising the precipitated matter from the bottom of the tanks, amounted to 73 tons, and cost £25. 11s.; and the cost of labour for working the engine, attending to the tanks and machinery, and for attending to and storing the manure or precipitate, was £76. 14s.; making a total of £550, which is equal to a cost of less than 2d. per annum per individual, or 2d. for every 16,000 gallons of sewer-water deodorized. These works have now been in efficient daily and continuous operation for the last six years, during which period all the sewer-water from the borough has been thoroughly disinfected, and rendered innoxious before it has been permitted to flow into the river Soar; and, to those who can recollect the condition of the Soar at the North Bridge, above and below, in former years, it will perhaps appear a desideratum that was worth paying for to obtain. These works, although commercially a failure, for the reason before given, have been most successful as a sanitary measure; and, although the gentlemen who expended large sums in the solution of this important question have been great pecuniary losers, nevertheless, the borough of Leicester has derived great benefit from their operations; and I believe it is an undisputed fact, that the sewerage of the borough has been more completely and economically effected than in any other town in England."

Price Current.

CASTINGS, PER TON.

Average Weight of Cast-Iron Gas-Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle.	Wales.	Yorkshire, Derbyshire, and Staffordsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	3 5 0	2 10 0	2 12 6	3 0 0	3 5 0
1½ and 2 inches Socket-Pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3 ,, ,,	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
4 and 5 ,, ,,	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 in. and upwards ,,	5 15 0	4 15 0	5 0 0	5 5 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
,, 2nd ,, cold ,,	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank Plates, ⅜ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1¼ in.	1½ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 ft., perft.	1 8	1 0	0 10	0 7	0 5	0 4½
,, ,, ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-Pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows—wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
,, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Plain Sockets [Nipples	1 3	0 9	0 8	0 6	0 5	0 4
	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	—

COALS, PER TON.

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead, at Leith	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	23 0
Pelaw	7 3	Capeldrae, 1st quality	20 0
New Pelton, Peareth, South Pelaw, Washington Hutton, and South Peareth	7 6	,, 2nd ,,	12 6
Pelton	7 9	Lesmahago, at Glasgow	25 0
Ramsay's Newcastle Cannel	16 0	,, ,, Leith	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	14 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham & Rochester	6s. 3d. to 6 6	Barcelona	£25. 0s.
Cork	—	Bordeaux	£15. 10s. to 16 0
Dover & Folkestone	5 9	Boulogne and Calais	7 15
Dublin	—	Cadiz	£15 to 16 0
Exeter Quay	—	Cronstadt	£13. 15s. to 14 0
Ipswich	6 0	Copenhagen	£9 10s. to 10 0
London (Pool)	6s. 3d. to 6 6	Genoa	—
Lowestoft & Yarmouth	5 0	Hamburg	£9 to 9 5
Lynn	—	Havre de Grace	10 5
Portsmth. & Southpton.	8s. 3d. to 8 6	Leghorn	22 0
Plymouth	3 0	Lisbon	15 10
Shoreham	—	Rotterdam	8 10
Whitstable	6s. 6d. to 6 9	Stettin	£10. 15s. to 11 0
Weymouth	—	Trieste & Venice	22 10

SUNDRIES.

Best Newcastle Fire-bricks	per 1000	30s. 0d. to 55s. 0d.	
Cliff's Fire-bricks, at Wortley	per 1000	55 6	
Ingham's Fire-bricks, at Wortley	,,	55 6	
Fire-clay Retorts	per foot run,	5s. 6d. to 7 0	
Tough Cake Copper	per ton	£98 0s. 0d.	
English Pig Lead	,,	19 5 0	
Welch Bar Iron, in London	,,	6 5 0	
Foreign Spelter	per ton	£18 10s. 0d.	
English Block Tin	,,	117 0 0	
Banca	,,	120 0 0	
Tarred Rope Yarn	per cwt.	26s. 0d.	

Advertisements.

ADDISON POTTER
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

TO Practical Gas-Fitters, having command of a capital of £400 to £500, there is an eligible opening for a young man of energy to take an established and lucrative business in one of the British Colonies.

Applicants to state the amount of capital they can command, with full particulars and references, to X., care of Mr. W. B. KING, 11, Bolt Court, Fleet Street, LONDON.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N.,
LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coal-fields (the most extensive and valuable in the parish of Lesmahago), respectfully intimate to the Managers of Gas-Works and Consumers of Gas Coal, that they are prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas-Coal Works, Lesmahago.

Shipping Agent for Glasgow:
MR. ALEXANDER STRATTON,
159, WEST GEORGE STREET.

TO be sold cheap, Two Governors by Parkinson and Co.—one for 10-inch, and one for 6-inch connexions. They are both in very good condition, having only been in use a few years.

For price, &c., apply to Mr. E. S. CATHELS, Gas-Works, SHREWSBURY.

THE Malta and Mediterranean Gas COMPANY, Limited, require a FOREMAN to take charge of the manufacture of gas at one of their stations.

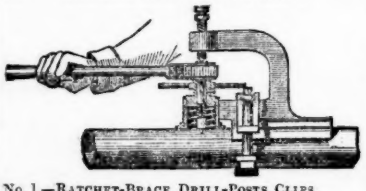
Applications to be made (with references, and stating full particulars), by letter only, to the SECRETARY of the Company, 30, CORNHILL, E.C.

COUNTY and General Gas Consumers COMPANY (LIMITED).

NOTICE is hereby given, that the DIVIDEND on the paid-up Capital of this Company for the half year ending 30th June, 1861, at the rate of 6 per cent. per annum, will be PAYABLE on and after the 16th of September instant, between the hours of 12 and 2 daily, at the offices of the Company, 76, King William Street, E.C.

By Order, R. S. PARKER, Secretary.
London, Sept. 2, 1861.

UPWARD'S
PATENT DRILLING APPARATUS
FOR GAS AND WATER-MAINS.



No. 1.—RATCHET-BRACE, DRILL-POSTS, CLIPS, BOLTS, TAP-DRILL, and NUT, for ¾, 1, 1¼ in., £9 1 0
No. 2.—RATCHET-BRACE, DRILL-POSTS, CLIPS, BOLTS, TAP-DRILL, & NUT, for 1½ and 2 ins., 10 6 0
MADE BY
BRYAN DONKIN & CO., ENGINEERS,
Near Grange Road, Bermondsey,
SOLE LICENSEES.

FOR Sale, at the Oxford Gas-Station, A Condenser, composed of 24 7-inch Flanch-Pipes, 9 ft. long, connected at top by Flanch-Bends, all standing on a cistern divided into 12 compartments.

11 7-inch Slide-Valves.
10 6-inch do. do.
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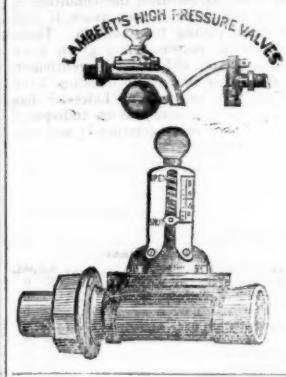

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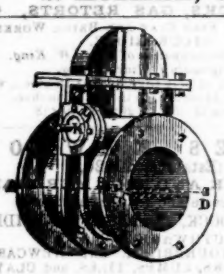

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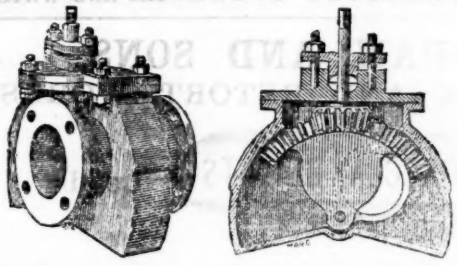

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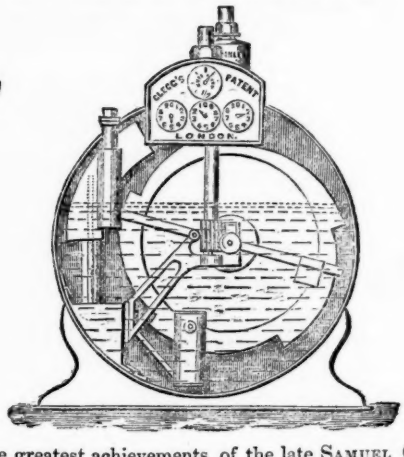

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This Meter is the last and one of the greatest achievements of the late SAMUEL CLEGG, C.E., in his connexion with the Manufacture and use of Gas, and, without presumption, it may be confidently affirmed to be the only Meter extant that can be relied upon to measure correctly, to work with the minimum of pressure, and steadiness of light. It cannot be tampered with by tilting or otherwise, and will be of great durability.

This Meter is constructed on an entirely new principle, and, when once adjusted, will always remain the same under all circumstances. The quantity or height of the water in it has no effect on its *capacity*. The immense importance and economy of this to Gas Companies who are obliged to employ so many inspectors, doing their utmost to prevent tampering with the Meters, is so obvious, that they will be able to appreciate its advantages over all other Wet Meters, where the varying height of the water regulates the capacity, and is, in consequence, a perpetual source of annoyance, bad feeling, and litigation between the Gas Companies and consumers.

The following experiments clearly point out our advantages, and can be readily tested:—

Old Water Meter.

2 pints above the line	..	5 lights	..	13½ per cent. fast.
1 „ „	..	5 „	..	7½ „ „
Water on the line	..	5 „	..	⅛ „ „
1 pint below the line	..	5 „	..	5 „ slow.
1½ „ „	..	5 „	..	7½ „ „
1¾ „ „	..	5 „	..	10 „ „

A fluctuation of 23½ per cent.

Clegg's New Patent Hydraulic Gas-Meter.

Water on the line	1 inch pressure	5 lights	½ per cent.	slow.
1 pint below	1 „ „	5 „	½ „	„
2 „ „	1 „ „	5 „	½ „	„
2 „ „	1½ „ „	5 „	right	
2 „ „	½ „ „	5 „	„	

A fluctuation of ½ per cent.

The Drum, from its peculiar construction, presents scarcely any resistance when moving through the water; and, its weight being taken off its axis by an air vessel, it revolves with the slightest pressure.

The comparative absence of friction in the Drum reduces the wear and tear, and enables it to be made of the strongest materials, which will keep it in working order longer than any other Meter.

It is approved and adopted by the principal London and Country Gas Companies, and is guaranteed to comply with the "Sale of Gas Act," as this Meter, beyond all doubt, works within a shorter range of registration than any other Meter manufactured.

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable.

MANUFACTURED BY

CROSLEY & CO.,

GAS-METER MANUFACTURERS,

103, SOUTHWARK BRIDGE ROAD, LONDON, S.E.

N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

CROSLEY & CO. are also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

similar to that manufactured by them, and verified by the ASTRONOMER ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by C. & Co. in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." They also supply

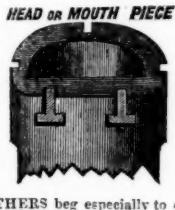
TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

C. and Co. are the only house in the trade which has for years manufactured Meters according to the standard measure set forth in the 2nd Section of the "Sale of Gas Act," and which also comply with the rules laid down in the Section for testing meters. Purchasers of C. and Co.'s Meters may therefore be secured against any additional expenses being incurred in order to adapt their Meters to the requirements of the new Act.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

THE WORKS ARE WELL SITUATED

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MESSRS.

CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Are prepared to supply their Meters duly stamped, under the authority of the Sale of Gas Act, 22nd and 23rd Vic., Cap. 66.

Fees for Stamping charged on Invoice.

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55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

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WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

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These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

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PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

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